Amateur Radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA
VOL 55, No 1, JANUARY 1987

SLOW SCAN
The GLICHER PADDLE
AMERICA'S CUP Award
SA JUBILEE Feature
Predicting the next SOLAR MAXIMUM
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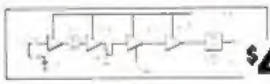

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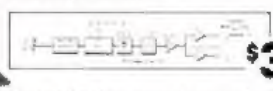
VFO Module Kit:
Gives full VFO control over 3.5-4MHz — designed especially for above transmitter, but can also be used as a general purpose variable frequency oscillator. Even has provision for FM modulation to give phone capability. Instructions include various modifications and options — and alignment details. Cat K-6327



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Amateur Radio

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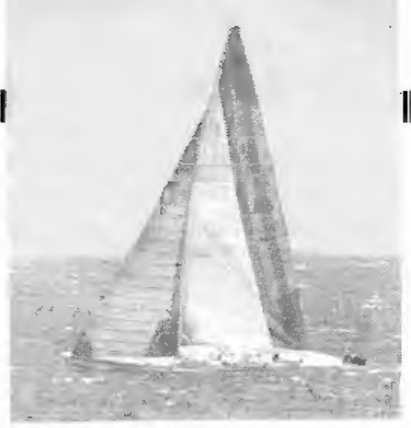

Australia II **in tests at Fremantle.** ***Australia II*** **ended 132 years of yachting history by winning the** ***America's Cup*** **in September 1983.**

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All copy for inclusion in the March 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9am, January 19, 1987.

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Editor's Comment

SQUABBLING SCHOOL-KIDS

There have always been examples in our hobby of rivalry between those of differing interests or concepts of how things should be. The oldest example by far is probably the rivalry, which still exists, between those who work CW and those who work phone. For a while the latter included the sub-groups of AM and SSB. We hear little of AM now, although some claim it still has a place. Others may be very uncomplimentary in saying where that place should be!

On VHF we have the FM group with its nets and repeaters, and also the SSB operators. Some members of each group can hardly bring themselves to admit that the other exists. Between the exponents of HF and VHF there is often a gulf of mutual ignorance.

We have within our own Institute two groups who handle third-party traffic. Each has its own way of doing things and tends to consider the others are ignorant or narrow-minded, or worse. "Over to You" has carried a number of letters on this theme lately. Then we have those whose purpose in life is to work 300-plus countries at the rate of six QSOs a minute. They seem to have little in common with those, frequently on the same band, who are content to "waffle" on for hours, making perhaps two or three contacts in an afternoon.

Dissension develops among DX diehards about the activation of rare countries. Aspersions are cast about the legitimacy of some activities. And then of course there are operating practices such as breaking-in on strangers, deliberate interference, etc. Do you enjoy having it done to you? Of course not, so why do it to others? But if it is done to you, tolerance will help more than "blowing your top"!

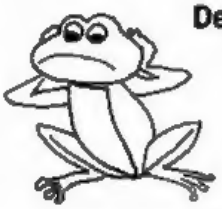
The number of divergent groups is even greater than the number of modes we may use. TV (fast scan, slow scan?). RTTY (AMTOR or not? ASCII or Baudot?). Packet (Vancouver or Tucson?). CW (manual or electronic?). Phone (AM, FM or SSB? USB or LSB?). Aircraft enhancement (reflection or refraction?). DX or ragchew? Contest or not? WIA or non-member?

Of course the last choice is a ring-in. It doesn't fit, does it? Or does it? Isn't it just another example of the all-too-common rationale that "My group is right or I wouldn't be in it. All the others are wrong!".

No one is wholly right. No one is wholly wrong. We ARE ALL radio amateurs! If we don't co-operate we collapse. Rivalry is all very well, but without tolerance we become squabbling school-kids.

The hobby of amateur radio is unique. There is no other with such impressive capability to unite the people of the world in friendly co- operation. Amateur radio can set an example to the world, to its leaders in politics or commerce, religion or economics, to show how understanding and tolerance can overcome all differences. Let us resolve, for this New Year of 1987, to stop our back-yard squabbling and begin to show the way!

Bill Rice VK3ABP
Editor



Department of Communications

Main QSP

VNG TO CONTINUE! for the time being

Refer page 58, November AR

The Minister for Communications, the Right Honourable Mr Michael Duffy MP, writes the following letter in reply to a letter from David Wardlaw VK3ADW, Federal President of the WIA.

I refer to your letter of 23 September concerning time and frequency signals from VNG Lyndhurst.

The attachment to your letter outlined the broad position in regard to Telecom's review of the VNG service.

Telecom wrote to all major Government users of the service indicating that if a Department or organisation wished to take over the operation of the service, Telecom would be prepared to make the existing transmitters available for installation at another site. Telecom could provide the necessary reference signals for any such relocated service through its own network at normal commercial rates. Telecom is also prepared to reinstall the existing equipment at cost.

An alternative proposal from Telecom was that a Department or organisation may wish to commission Telecom to provide the broadcast service on a commercial agency basis but from another site.

The response to Telecom's proposals was somewhat disappointing in that only three out of seven Departments replied, one indicating that their needs could be met by other technology now available and the others advised a continuing need for VNG but not specifically taking up the Telecom offer for the equipment transfer or provision of the service on an agency basis.

In view of the use identified by the Departments concerned, Telecom has indicated that it will continue with the VNG service for the time being. It will consult further with the Departments who have indicated future requirements for the time and frequency service.

However, Telecom's position is clear in that whilst it will continue to negotiate with interested Departments, it cannot continue indefinitely meeting the costs of a service for which it has no use itself nor any charter to provide.

Yours sincerely

Signed: Michael Duffy

6 November 1986

AMATEUR THIRD-PARTY TRAFFIC — DOC GUIDELINES

Following is text of a letter received by the WIA from the Department of Communications

I refer to the recent editorial in *Amateur Radio* (AR) magazine concerning amateur operators soliciting for third-party traffic.

At the outset I feel it important to explain that third-party traffic with another country is not something that may be simply approved by the Department on request. Australia is in fact required by international regulation to first negotiate a formal agreement with the other administration. No third-party traffic exchange can therefore be permitted unless such an arrangement is in force.

Natural disasters also require the formal consent of the other administration to be obtained before Australian amateurs can be authorised to pass third party messages. The Minister may only authorise amateur third- party traffic with the country concerned once this procedure has been completed. I would mention that approval would only be granted for the duration of the disaster.

In relation to the AR editorial, I would confirm that several years ago the Department did advise that amateur operators should not solicit for third-party traffic. This advice, however, was given prior to the introduction of the Radiocommunications Act 1983. Under this new legislation no specific regulations have been prescribed concerning the practice of soliciting for messages.

Due to the article and the number of recent inquiries, I consider that it is now necessary to establish a formal set of guidelines in regard to soliciting for messages. Accordingly, I would advise that:

- amateur operators should only solicit for messages as an aid to providing third-party traffic communications in a declared emergency situation or natural disaster; and
- any advertising for such messages should be conducted in a responsible manner and involve no pecuniary gain or other reward.

I trust that the information outlined serves to explain the Department's position in this matter. I would also mention that a suitable provision will now be incorporated in the revised *Amateur Operators Handbook*.

Signed: W May
A/g Manager Regulatory Operations Branch
Radio Frequency Management Division
Canberra

6 November 1986

Cover Story:

THE FIRST AMERICA'S CUP AMATEUR RADIO AWARD

The delightful silver cup is over 130 years old, but has only had two owners.

The America's Cup began in 1850, when a syndicate was formed by an American, John Cox Stevens, and commissioned George Steers to design a yacht, capable of being taken to Britain to race.

America, although designed for racing, was luxuriously appointed with saloons decorated in rosewood, walnut and green velvet.

When *America* arrived at the Isle of Wight, it was announced that she was ineligible to race as she was owned by a syndicate rather than one person. Stevens immediately tendered a $10 000 stake to any squadron yacht of the *Royal Victoria Yacht Club* prepared to race *America*.

The Club was embarrassed by the resulting furore and invited *America* to participate in the annual race around the Isle of Wight for a prize of a 100 guinea silver cup. *America* won convincingly and the Stevens syndicate took the cup home to New York.

In 1870, *Cambria*, of the Royal Thames Yacht Club, challenged the New York Yacht Club for an opportunity to win back the cup — she finished 10th and so began the United States monopoly of the cup!

In 1879, Sir Thomas Lipton (of tea-fame) began a quest for the cup. Sir Thomas was soundly beaten, 3-0, however, he returned in 1901 and was encouraged when he lowered the winning margin of the American yacht to only two seconds in the last race. In all, Sir Thomas made five challenges to win the cup but was unsuccessful.

In 1930, the venue for the challenges was changed to Newport but it was still impossible to wrest the cup from the United States.

Australia's first challenge for the America's Cup was in 1962, with the yacht *Gretel*. Although the competition was lost 1-4, *Gretel* certainly did not disgrace herself.

Dame Pattie a yacht named after Dame Pattie Menzies, wife of the late Sir Robert Menzies, was no match for the American *Intrepid* in 1967, and was beaten 4-0.

Gretel II participated unsuccessfully in 1970 and in 1974 Alan Bond began the first of his attempts to capture the cup with *Southern Cross*.

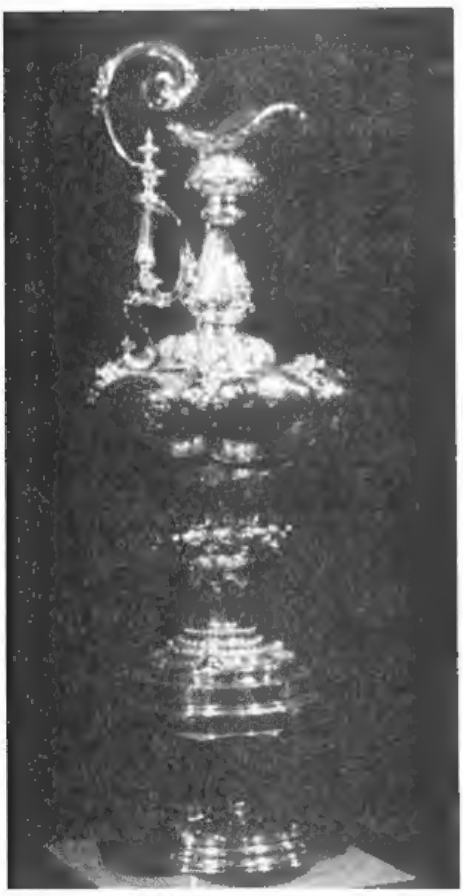
Who could forget that day in September 1983, when Australia broke 132 years of yachting history?

1977, saw the Bond yacht, *Australia* beaten by *Courageous*, a faster boat which was sailed by a crew with a better knowledge of the racing course. *Australia* was modified for the 1980 series but was again beaten — 4-1.

The 1983 challenge was to change the history of the America's Cup. Much controversy surrounded the unusual keel of *Australia II*. She lost the first two races, won the third, lost the fourth, then won three consecutively to bring the America's Cup home to Australia — it had taken 132 years and many challenges to finally take the America's Cup from America!

This summer, the best of the world's 12 metre fleet are contending for the cup. The finale begin on January 31, and will be a series of the best of seven races.

—Compiled by Bert McLachlan
VK2



For the first time in the 135 year history of the *America's Cup*, a special event amateur radio station has been established and has operated from various locations in Perth and Fremantle. This station has the call sign VK6CUP. A special award is available to amateur radio operators and shortwave listeners, who establish communication with, or reception of, VK6CUP and achieve the required points.

Who could forget that day in September 1983, when *Australia II* ended 132 years of yachting history by winning the *America's Cup* and thereby changed the pschye of a nation. Not since the 1940s, during the war, had Australians been so united under one flag. This euphoric occasion resulted from the determination and dedication of a group of Australians to achieve their ultimate goal and this fighting spirit symbolised by the flag of the *Boxing Kangaroo*.

In Perth, the greatest sporting event of our time is now under-way. Australian yachtsmen will defend the nations yachting honour on home-waters for the first time. More yachts, more crews, more challengers ad sponsors than ever before.

The challenge to the *Royal Perth Yacht Club* for the America's Cup has come from 14 yacht clubs from six nations: Britain, Canada, France, Italy, New Zealand and the USA. The

The VK6CUP Special Event Station was in operation during the 1986 Jamboree on the Air in October. It was set-up on the banks of the Swan River at Matilda Bay 1st Pelican Point Sea Scouts, adjacent to the Royal Perth Yacht Club, the new home of the America's Cup Trophy. The station contacted many local and overseas amateurs and other JOTA groups.

six Australian yachts defending the Cup are from three yacht clubs: the Royal Perth Yacht Club, the Royal South Australian Yacht Squadron, and the Sydney Yacht Squadron. There has never been a sporting contest such as this, where the road to the race is so long and arduous. The crews and support teams competing in Fremantle face four full months of racing simply to earn the right to challenge and defend in the final best-of-seven races!

As Australia is the first and only nation to conquer the American 12 metre sailing machines, it is only fitting that the inaugural America's Cup Award for Radio Amateurs should be from Australia with the call sign of VK6CUP. Our thanks go to the Department of Communications for their co-operation in granting this special call sign.

So, why don't you join in with the excitement of the America's Cup Defence and also receive an attractive award. When you hear VK6CUP on our amateur bands, make a contact or log a QSO if you are a SWL, and receive four points towards the achievement certificate.

The points scoring and requirements are as follows:

1 Stations outside Australia (DX), require four points to achieve the award by:
a. Contact with VK6CUP Special Event Station worth four points; ie one contact entitles you to the award
OR
b. Contact four licenced amateur radio stations in VK6 — each contact is worth one point.

2 VK Stations, require 12 points to achieve the award by:
a. Contact with VK6CUP (four points) and eight other VK6 stations
OR
b. Contact 12 licenced amateur stations in VK6.

3 All authorised bands and modes are permitted.

4 All contacts made after October 5, 1986 until the final deciding race in February 1987 will be eligible.

5 All contacts are to be listed showing Date, Time, Band or Frequency, and RS/T report.

6 Shortwave listeners are eligible for the award as per the above criteria.

7 QSL cards are not required for proof of contacts with VK6 stations, however the application is to be accompanied by an extract of the station log and/or QSL card and is to be certified correct prior to the award being issued.

8 Please include $A2 (or four IRCs) for post and packaging.

Following are the frequencies (±QRM) and times for VK6CUP:

1.825 MHz	0800-1500 UTC
3.525 MHz	1100-1500 UTC
3.585, 3.620 MHz	1000-1700 UTC
7.012, 7.080 MHz	1100-1600 UTC
10.137, 10.147 MHz	0100-1000 UTC
14.052. 14.187 MHz	0800-1200 UTC
14.212 MHz	2200-0100, 0400-1600 UTC
21.180 MHz	0100-0400 UTC
28.512 MHz	0100-0700 UTC

Send applications to:
VK6CUP Award (VK6XV), WIA VK6 Division, PO Box 10, West Perth, WA. 6005.

RESCUERS NET

Surf lifesavers on Tasmania's north-west coast have a new UHF network which includes a repeater on Round Hill, Burnie.

The system gives reliable link communications for the first time between clubs at Burnie, Davenport, Ulverstone, Penguin, Somerset and Boat Harbour.

NEW RTTY NIGHTOWL THEATRE

Jim Linton VK3PC
4 Ansett Crescent, Forest Hill, Vic. 3131

Something unusual and probably unique in amateur radio happens in the greater Melbourne area and Geelong district each Thursday night. The *New RTTY Nightowl Theatre* takes to the two-metre RTTY simplex frequency and it is 'loads of fun'.

Dave McAulay VK3EW, who mans the ticket-box (check-ins), runs the show (disc-stored) and chats with the theatre-goers at intermission, says the idea is to promote radio teletype and the enjoyment of doing something other than chase DX or rag-chew.

Dave says; "It is more than playing with computers all night, gets away from Packet Radio, which is interesting, and keeps RTTY alive. The Nightowl Theatre is enjoyment rather than just typing off a keyboard and having a *plastic* QSO."

Recently some of those in the Melbourne RTTY scene claimed RTTY was dead and people had moved on to other activities including Packet and AMTOR.

"RTTY is not dead — sure a lot more people are experiencing Packet and AMTOR — but look at RTTY on the HF bands — and with the RTTY Nightowl it is alive on VHF. No matter what anyone says about RTTY being alive — there is always enjoyment in looking at a piece of text or a picture coming through," Dave says.

There is plenty of teleprinters sitting in shacks, particularly following the release of Siemens M100 machines through the WIA Victorian Division and the now defunct RTTY Fixers Group.

Dave says the RTTY Nightowl Library has about 175 pictures, the smallest with a running time of one minute at 45.45 Baud to the longest 130 minutes. The text library has 100 pieces — some humorous, others witty, the zany and helpful RTTY hints and teleprinter modifications. They range from about 45 seconds to the longest — a radio mystery serial "Who Killed the Signal?" in 54 individual pages, each running about 10-12 minutes which were typed by Lindsay Rohrlach VK3KAF.

Lindsay, with help from John Brennan VK3BNE, ran RTTY Nightowl on a Wednesday night from 8 pm to midnight or later, for about 11 months until early 1986.

Due to other commitments, Lindsay ceased Nightowl — and VK3EW revived it in August 1986.

Dave says it usually has a format of three or four straight pictures, then some pieces of text, an overtyped picture with more contrast and then requests.

Held on Thursday nights, it starts between 8-8.30 pm on 146.600 MHz and finishes around 10.30 pm. Check-ins vary from four to up to 15 — but there would be many more listening, including unattended equipment printing out the night's activities.

Dave has the picture and text library stored on computer disc. He can send the library index on request at a range of speeds in either Baudot or ASCII.

He is forever looking for new pictures or text, either off the air or via the mail. His favourite pictures include the cartoon characters by Bob Tippet VK3DRT, at Geelong.

Dave says; "He is one of these people who can look at something walk away and type it onto a teleprinter — Bob is a very gifted person in the way of pictures."

The pictures by John VK3BNE, also at Geelong, such as the Spitfire and Messerschmitt B109 are also very good.

"One of the best by Ken George VK3DKG, is a full size head of a tabby cat. The way we print it is, first the left hand side of the face and then the right side, and both print-outs are joined together. It runs for 130 minutes at 45.45 Baud — and when you stand back at three metres with the usual can of RTTY operator oil, it looks very, very nice," says Dave.

Congratulations VK3 *Electric Wireless for adding a dimension to the pleasure of machine telegraphy RTTY operations.*

EARLY RAAF TRANSMITTERS

Ted Roberts VK4QI
38 Bernard Street, Rockhampton North, Qld. 4701

AT-6

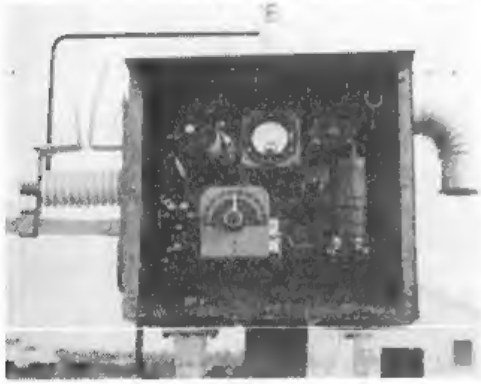
The AT6 was considered by the few amateurs who had any experience with it, to be an ideal post-war amateur transmitter.

It was developed as an artillery co-operation transmitter for use between Fortress Artillery and Spotting Aircraft under their control (usually Wirraways). In some units, the transmitter was installed in the fortress area, but serviced by the RAAF. Operators were supplied as needed by the RAAF at the fortress command posts and were commonly used as observers.

Associated receivers, usually AR10s, were also supplied by the RAAF.

The transmitter was a 100 watt CW transmitter, with a frequency range of approximately two to six megahertz. Because of the limited requirement for this type of unit, very few of them were manufactured by the supplier, AWA. The whole concept of aerial artillery spotting techniques were little changed from WWI, hence the use of telegraphy for control of the "shoots."

It was mounted in a cabinet of standard relay rack size, and stood about five feet (1.5 metres) high. The stages were a 6V6G crystal or master oscillator, a 6V6G buffer, 807 driver, and a single 813 PA. The HT power supply used a pair of 866A mercury rectifiers at about 1500 volts with a minor HT and bias supply. *(How many amateurs built their post-war transmitters to the same specifications?).* There was ample space in the cabinet for the later installation of an AM modulator for anyone lucky enough to obtain an AT6 through disposals sources, although I never heard of any attempts to modulate these units in the Services!



The AT-6 ATU, Darwin 1940. During the "Wet Season" the grass was higher than the ATU!

The transmitter output was fed via a 600 ohm line to an aerial tuning unit, which fed a quarter-wave vertical aerial, usually dropped from a triatic or another aerial system overhead, and the unit was usually on a fixed frequency. After all, it would be very unsporting for any potential enemy to jam that frequency when it was needed most!

T-77

This was a 4/500 watt MF CW/MCW transmitter of Air Ministry design. Not very many of these units were supplied to the RAAF.

They were sometimes referred to as "meat-safe" transmitters because of their construction in a perforated metal case with several glass access doors in the front panel. They contained English valve types and the HT rectifiers were mercury vapour types with giant Edison Screw Bases.

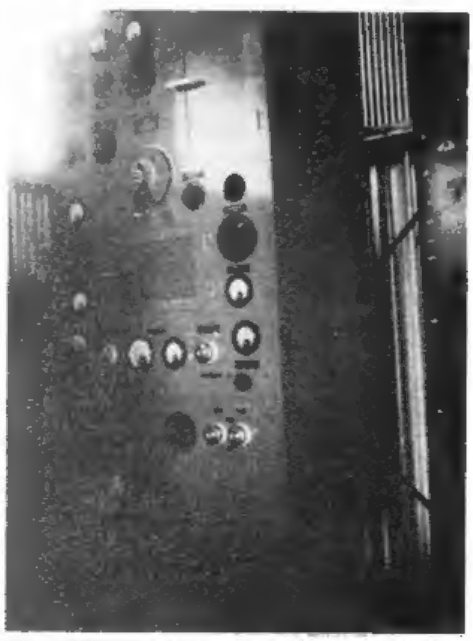
MF was never popular in the Darwin area due to the high noise level most of the time, so this virtually ruled out their use for the demanding ground/air service which they were intended to

AT-6 transmitter.

fulfill. However, they performed excellent service in more temperate climates, where the atmospheric problems were not so apparent.

Consequently, the T77 at Darwin had little use and was left in an unserviceable state because of a major fault and no real incentive to repair it.

Eventually, one "Bluey" Shaw decided to rectify this situation and delved into the innards with eventual success and an amusing sideline. He had been working on the unit for most of one shift and at the conclusion of the shift, delivered his diagnosis to his relief, "Smoky" Gray, an Air Force W/T OP Mechanic of many years standing, but an extremely wary man. Bluey emphasised his diagnosis by saying; "It's in here, Smoky," waving his hand back and forth in front of the HT section. Smoky's mouth was open but he was unable to utter a word because of sheer terror and could only keep pointing at the unit. Bluey finally turned and saw a small snake coiled around one of the rectifiers. Quick action ensued with a surge of power which resulted in one sizzled snake.



The T-77 MF transmitter located at the temporary W/T station, Darwin 1940.

AT-8

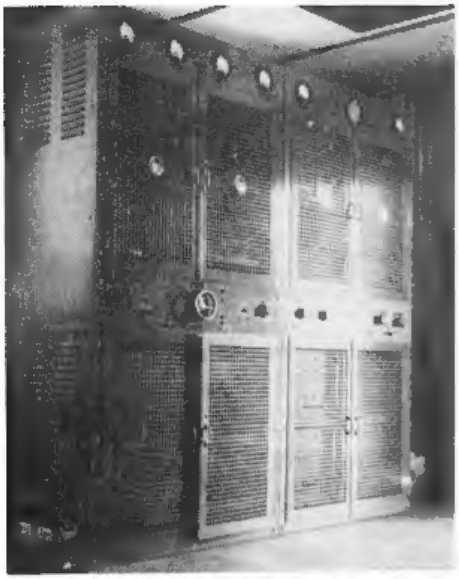
This 500 watt HF CW/MCW transmitter was constructed by STC with a frequency range of 2-20 MHz and first appeared at Darwin in late-1940, early 1941. The final was a 4251A.

The transmitter has an eight-position rotary switch on the front panel to select CW or seven different MCW tones as required. It used to cause consternation when the transmitting station operator, to relieve his boredom, switched from CW and would run up and down the MCW range a few times whilst the transmitter was being keyed. (It was wisely said, "The Devil finds work for idle hands!").

The 12 mile station, Darwin 1941.

At Darwin, the RAAF and the Department of Civil Aviation established a joint permanent transmitting station at "12-mile", or sometimes called "11-mile" — depending on the speed-o-meter. It was first used by DCA, who had an AWA multi-channel transmitter installed there — it was possibly a type J2876 which used four 805 triodes in the PA-stage. It was built like a battleship and was quite reliable provided there was no trouble in the telephone dial control system. This dial control operated through a Strowger Bi-motional switching system and could be controlled from the Aeradio or transmitter site, as required.

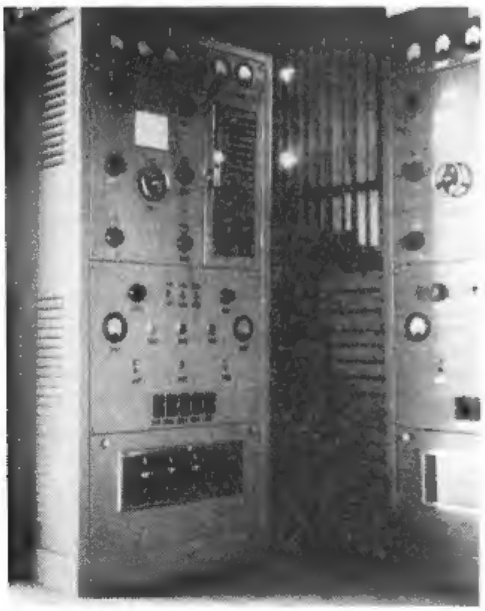
This was capable of dialling the transmitter functions, such as filaments on, frequency select, emission type select (CW, MCW or R/T), HT on, and close down, from VZDN Aeradio, the station at the Civil Aerodrome, Darwin, or from the transmitter site.



The AWA Multi-Channel Transmitter, 12-mile Darwin, 1941.

The temporary W/T station, situated at Parap.

Except for the first two AT8s, which were installed at the temporary W/T station at Parap, all new models of RAAF transmitters which arrived in Darwin were installed at this station.



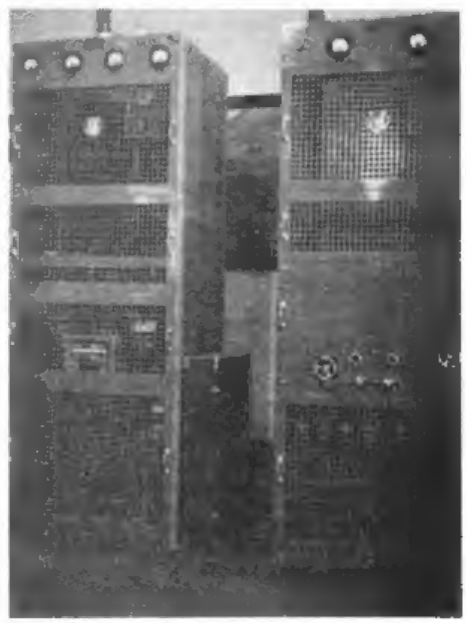
The AT-8 transmitter at the temporary W/T station, Darwin 1941.

Several STC type 14S transmitters arrived with a number of the AT8s. These were 1 kW multi-channel telephone dial controlled transmitters. The system for the 14S used a PMG uniselector switch to control all remote-control functions.

Each channel was selected by a solenoid operated push-rod (pull-rod?), about 13 mm diameter, which ran the height of the RF cabinet. The solenoids were massive devices and, just to make them operate, it was necessary to roster an extra stoker on duty at the local power house!

About mid-1941, I left Darwin after some time spent on squadron duties. Smoky Gray and I travelled overland by rail, drove in an early Army convoy from Birdum to Alice Springs, and then travelled by train to Melbourne. After some leave I was then posted to Richmond W/T station, west of Sydney. When this old W/T station was closed down I was posted in charge of the new replacement station at Londonderry.

Londonderry Station, 1942.



The AWA MF W/T Station, Richmond 1941.

At Richmond, I came into contact with many new types of transmitters and first became acquainted with the old T28.

As MF was the accepted mode for air-ground communication at Richmond, (had been for many years), I was interested in their modern version of a MF ground transmitter. This was a successful variation of an AWA marine transmitter with some 400 watts output. In marine applications it consisted of three units, with a common switchable power supply.

For RAAF use, an extra power supply was obtained and each RF unit was wired to its own power supply. This meant we had two transmitters, one HF and one MF. The final was four 805s with output power about 400 watts.

The late Jack Parris VK2DN, was in charge of moving the transmitters from the old Richmond site, reinstalling them and ensuring they were operational at the new site. He received a bad RF burn to his right hand and wrist whilst adjusting the aerial coupling taps. He had switched the HT off but the "switch" was only a mechanical drive to an ordinary light switch inside the transmitter and this had failed to operate. Consequently, Jack shook hands with 1500 volts and received plenty of RF as the transmitter was in a key-down condition!

T-1087

Another Air Ministry HF transmitter was the T1087, 500 watt transmitter. It used English valve types and the PA output was pi-coupled and could load into nearly anything (probably even the proverbial piece of wet string!).

The aerial feeder line from one of these transmitters ran very close to the outdoor chemical toilet. One day I was amazed to hear, and copy, a weather transmission whilst seated in this room. Apparently rectification of the signal took place in the toilet's exhaust pipe and was quite audible.

The RAAF by this time, had perfected a system of "High Speed Morse" W/T transmission and, no doubt, many Old Timer RAAF W/T operators and telegraphists and WRAAF wireless ops would well remember it. Basically, it consisted of keying the point-to-point transmitters at 60 WPM, not I hasten to add, by very well-trained operators, but by punched tape running through Wheatstone Keying Heads. The tape was perforated by Kleinschmidt perforators; a typing keyboard driving a tape punching system. At the receiving end the receiver BFO was set to give a beat-note of about 2500 Hz. The receiver audio output was recorded on one of the oldest audio recording machines — a Dictaphone Wax Cylinder Recorder — running at three times normal speed. The resultant recordings were allotted to receiving operators, who replayed them at normal speed; ie at 20 WPM with an audio note of 800 Hz. Consequently, fair copy was made. This necessitated careful attention to keying relay adjustment to prevent unnecessary garbling of the transmission.

AT-13

Whilst on loan to the newly formed Central Area Headquarters at Point Piper, New South Wales, I was involved in the installation of a number of AT13 AWA transmitters at the DCA transmitter site near the mouth of the Cooks River, Brighton-Le-Sands.

These transmitters were HF units with 500 watts of output power, as were their mobile counterparts, the AT13B. (Another version was the AT13A MF/HF transmitter and the mobile version, AT13C). These transmitters all employed 4 x 813s in the output, driven by 807 drivers and buffers with 6V6Gs as oscillator and isolator stages.

The usual 866s HT and minor HT rectifiers and 5V4s for the lower HT supplies were used in these units. The main HT supply, with its rectifiers were the lowest slide-in unit in the transmitter. After a few days rain, the local field mice at Brighton would enter the station for warmth and what warmer place was there for them than these transmitters which were running 24-hours a day? Frequently, there was a flash, and a thump as the power supply hiccoughed and it was all in a days work to look for the transmitter that had overloaded, slide out the HT tray, dispose of the mouse remnants under the rectifier sockets and fire up the transmitter again.

The bulk of the Service CW Traffic was probably carried by the AT13 series transmitters, with an equal share being taken by the "Rolls Royce" of wartime RAAF transmitters, the AT20, manufactured by STC. The valve lineup of the AT20 was nearly identical to the AT13. The main difference in the design approach taken by the two manufacturers was their approach to the tuned circuits, particularly the PA tuning. The AT13 series used conventional variable C, switched inductance, whereas the AT20 switched C, and used roller inductors to effectively tune the PAs. A plate modulator was developed for the AT20 using a pair of 813s as modulators and made this unit a very effective HF R/T transmitter, where fitted.

AT14, AT14A, AT15, AT15A and AT17

Another local designer of ground transmitters for the RAAF was Thom and Smith, better known as "Tasma." Their contribution was the AT14, AT14A, AT15, AT15A and AT17. The AT14 series were HF transmitters capable of CW, MCW, and R/T operation. Their output power was 200 watts and the PA was two 813s, cathode modulated by a pair of 809s when in the R/T mode. These were very reliable short haul, point-to-point transmitters and were also very useful in the R/T mode. The main difference between the fixed and mobile versions was that the fixed version was complete in the one cabinet, whereas the mobile version comprised two units with an interconnecting wiring harness. It could, and usually was, operated with the RF unit seated on top of the power supply unit. (This was basically the design difference between all types of mobile and fixed transmitters designed to RAAF specifications during WWII).

Tasma's AT15 series of transmitters were 200 watt MF units with a similar valve line-up to the AT14s except for the different frequency range. The PA was tuned by a variometer-type variable inductance. They were used mainly as homing beacons at various aerodromes and operational bases.

Post-war, while working at DCA in Lae, New Guinea, we had an AT15 NDB running continuous carrier and keying identification -LA LA-. We used to rough check operation by drawing an arc from the aerial terminal with a screwdriver. Audio was clearly audible in the arc, although very distorted.

One of the PNG nationals, employed as a radio maintenance rouseabout was demonstrating this technical masterpiece to one of his "one talks" (from the same tribal village). Things did not go quite as he had planned and he received a nice RF burn, as well as "one heck of a fright." He flew out of the open door as though jet-propelled, closely followed by his "one talk." The last that was seen of him for a few days was his lap-lap way above his knees and his legs going like the connecting rods on a 38 Class Steam Locomotive at high speed!

AT-17

When posted back to the Darwin area for a second tour of duty in mid-1942, I made the acquaintance of the AT17, a 150 watt VHF AM transmitter with FM capability. It was the first RAAF VHF ground transmitter, although there were some Air Ministry VHF transmitters, receivers, D/Fs and aircraft transceivers used by 54 Fighter Wing *Spitfires* in Darwin earlier.

The AT17 had a pair of 100TH triodes in the final and had frequency multiplication of 36 or 48 from the crystal oscillator. One peculiarity was that either the neutralising or PA plate tuning was done by stretching or closing the appropriate coil like a spring by means of a threaded drive. These were used to fill the need for ground transmitters when the RAAF aircraft were equipped with VHF (SCR522) in 1944.

Before the SCR522 was brought into service, VHF was in use in 54 Fighter Wing, Darwin. The Wing consisted of three squadrons of *Spitfires* and their support facilities. The aircraft were equipped with Air Ministry type TR1133D transceivers, which the RAF technicians assured me were developed from a successful police net of mobiles in one of the provincial English cities.

The ground support equipment was mounted in vans and the portable design philosophy was outstanding. All cables and 27 metre aerial masts, jury mast and aerials were capable of being broken-down and fitted into/onto the vans or their trailer AC power units. The masts were three-sections of cast magnesium alloy, and were extremely light although the maximum diameter was four inches (101 mm) or more. A fourth section of this mast was used as a jury mast to enable quick erection of the mast and aerial system. The aerial system consisted of two J-aerials mounted at each end of a short boom at the mast-head.

The final valves in the transmitter were an English-based version of the RCA 834 triode. When spares were no longer available from RAF sources, a shipment of 834s from AWA was arranged, the valves were re-based and everything was operational again.

Associated ground equipment included a receiver unit, a modified receiver from the aircraft transceiver. (This receiver was also used in conjunction with suitable aerial systems for direction finding).

Three D/F stations were employed in a triangular arrangement on the ground and one aircraft in each formation was D/F Guard. His transceiver was automatically switched to Channel D for 15 seconds transmission and then returned to the operating channel for the remaining 45 seconds of each minute. Three bearings were forwarded to the Fighter Control Unit, where I was stationed, and the formation position was plotted by triangulation. This gave our own fighter positions at all times, thus lessening the need to distinguish the fighters from all the other radar plots on the table, whether friendly or otherwise. This ensured a much quicker and more flexible means of vectoring or directing the fighters to a successful interception.

TELERADIO 3BZ

In the Radar Stations, which were the heart of the Fighter Control System, the need for reliable communication to the Fighter Control Unit was of paramount importance. They began with a well proven unit manufactured by AWA. This was the Teleradio 3BZ, and many found their way into the shacks of amateurs after the cessation of hostilities. Some of the performances achieved by these units were almost incredible.

Quite a number of the radar station operators were bitten by the DX-bug as a relief from the boredom that months of isolation with the same faces brought-on. DXing was strictly frowned upon, but was still a change and a relief to talk to someone different.

Later the 3BZs were left as backups and the radar stations were issued with AWA AT5/AR8 aircraft radios. The radar stations were usually powered by a Ford 10 engine driving a 3 ½ kVA 240 volt alternator. The 3BZs and the AT5/AR8s were battery powered and keeping the main and standby batteries charged was quite a headache until a "bright-spark" started the practice of charging his batteries in series with the DC field voltage of the alternator.

Other types of ground transmitters were used, but I never had any direct contact with them, however I was impressed by one pre-war transmitter I saw as a visitor to the Point Cook Transmitting Station. This was an English STC transmitter, type R16, with a power output of 4 kW. It was housed in two large black cabinets with the larger cabinet being the power supply. STC was an ardent exponent of the merits of the selenium rectifier. Apparently, the HT supplies were rectified by many selenium rectifiers. On of the WT operator mechanics said it was a nightmare-operation checking through all the rectifiers whenever the transmitter failed because of lost HT, replacing the MR906 or whatever, or else shorting it out as a temporary measure.

One of the major requirements with transmitters is ensuring they remain on frequency. The Service methods of doing this also became more modernised (should I say civilised), as time went by. The measuring systems were, at all times, state-of-the-art, although they were becoming a little hoary by the outbreak of WWII.

Frequency meters in common use with the RAAF when I was first involved, were usually absorption-types. There were two models — W66 and W67. The W stood for Wavemeter. One was an MF, the other HF absorption type, with a neon lamp indicator. They were robust and well made and reasonably accurately calibrated. How did we know the accuracy? By checking several units against each other!

At the temporary transmitter station, Darwin, the point-to-point transmitter would be set-up on 14.505 or 7.800 MHz by the wavemeter. We would then net to zero-beat with the receiver output fed down the phone line from the Signals Office after they had tuned to zero-beat with the Air Board. This was hardly an ideal method, but it worked! So long as we never strayed onto the Japanese Press Station nearby, nobody seemed to worry.

I may add, that at the same time this system was in operation, the RAAF had a general Radio primary frequency standard at the Signals School, Laverton, but this didn't help the squadrons or distant stations.

Some of the older stations were the first to receive the type W42 heterodyne wavemeter. This was a fine piece of equipment and beautifully constructed. This was another Air Ministry device and the tuning condenser has rarely been surpassed for precision workmanship. It was driven by a long bakelite handle directly — no reduction gears or friction drive — and the vernier reading was made through a magnifying lens over the scale.

The technique was to divide the required frequency by two prime numbers; say 3 and 7, set the frequency to zero-beat with the third harmonic of the wavemeter, and then check the seventh sub-harmonic of the required frequency. If a beat was heard there, the transmitter could only be on the correct frequency.

We then moved into the more modern era of the Bendix frequency meter, which remained the standard method of frequency measurement for the remainder of the war. These meters are better known to amateurs as the SCR211 frequency meter in its various versions.

The first Bendix frequency meter used in the RAAF was the type LM8. These were virtually identical electrically but were much smaller. They were supplied with the original purchase of the *Catalina Flying Boats*. These units soon revolutionised the accuracy of transmitter frequency checking throughout the Service.

HF AERIALS

The HF aerials used by stations gradually changed from aerial/counterpoise and centre fed dipoles to more sophisticated models. For air ground circuits, ¼ wave verticals were sometimes used for their omni-directional properties and eventually the RAAF were using delta fed dipoles almost exclusively.

This concludes a brief look at the service ground transmitters. I am indebted to Group Captain E R (Bon) Hall for permission to quote details such as power outputs, etc. Anyone interested in RAAF radio history would be well advised to read Group Captain Hall's book A Saga of Achievement. If readers get a small amount of enjoyment out of these articles I will count myself well repaid for the pleasant task of compiling them, and the pleasure of the memories of those days and the people who made them so memorable!

ar

QSP

INTERNATIONAL RECOGNITION

A Western Australian circuit board manufacturer has refined a technology of US origin so successfully it is now exporting defence-standard boards back to the USA.

Circuit Technology Australia's (CTA) ElectroWire boards are used in both Australian and US ground support systems for the F/A-18 fighter plane now coming into service in the two countries.

ElectroWire is a multilayer circuit board incorporating discrete wiring layers with the electroplating finish of a multilayer board.

Through its own development program, CTA has refined the combination of discrete wiring technology in Multiwire, licenced from Kollmorgen Technologies (US), with conventional multilayer processing.

—From *Electronics News*, August 1986

POWER GUARD

Power Tech has released an upgraded version of its successful Power Guard Series of computer grade power supply systems.

The latest Power Guard is a compact and cost-effective way to protect small computers and word processors from all types of power supply faults and line noise, providing a safe single point earthing system which is required by computer manufacturers.

The improved unit has been designed for Australian conditions, and is suitable for desk mounting and comes complete with four outlets for computer and peripherals and contains a circuit breaker for complete protection.

—From *Electronics News*, August 1986

Gordon Thurston VK4AGM
Gordon Lane, Mount Morgan, Qld 4714

SLOW-SCAN

A computer program that should make slow-scan television a little less of a mystery for the average amateur.

This computer package is capable of receiving a range of different speeds. There is a screen dump program in it, a transmit program, and an enhancement program to filter out noise from the screen.

It occurred to me when I first bought a computer that it would be capable of decoding a wide range of signals from the air. There were some programs available overseas but I had not seen any locally. This has taken at least two years to write and I am pleased to be able to share it with others.

The program is written for the Tandy Colour Computer. It was written for a 64k machine, but it should work on a 16k machine with changes. If anyone is interested, would they please write to the address above and I could alter the program to suit their machine, if there is enough interest.

I use the program with disc drives but it works equally well with a cassette. The program works by putting in an audio signal from the receiver to the cassette input lead, which is a standard connector. Each audio cycle is timed by a zero crossing detector, and recognised as a synchronous pulse, or something between black and white. Synchronous pulses are 1200 Hz, black is 1500 Hz and white is 2300 Hz. After decoding, four pixels are placed on the screen, giving five levels of gray from white to black. This is limited by the 256 x 192 pixel screen on the COCO, but by using an extra portion of the next screen, the whole 128 element by 120 line picture is received.

The resulting picture is then manipulated by BASIC, and can be saved to disc, cassette, sent to a printer, enhanced, borders added, etc. Simple commands can be added to add borders, captions, etc. The picture can be re- sent, or a screen built-up and sent as a written message such as CQ SSTV. The possibilities are numerous. A digitiser could be used to put a photograph on the screen to send.

Type the program in, and save it to disc or cassette before running, as just one mistake in typing can cause the Machine Language portion to run rampant over the program in memory, and lock-up the computer.

When the program is running, tune an SSB receiver to 14.230 MHz or 21.340 MHz Upper Sideband. Push any key to enter the menu. Most of the commands are listed in there, however a little more explanation may help.

C enters change mode. The parameters are originally set for eight second video. This can be changed by entering 7 or 12 for 7.2 or 12 second video.

```
10 PCLEAR8
20 AUDIOON
25 PC=1
30 CLEAR200,29999:CLS
35 DEFFNP(X)=PEEK(X*256+PEEK(X+1)
36 DEFFNPO(X)=(((X/256)-INT(X/256))*256)
40 FORA=30000TO31082:READP:POKEA,P:NEXT
50 'LOADM"DSPLY"
60 L1=&H7536:L2=&H7537:L3=&H7538:L4=&H7539:L5=&H753A:SP=&H7531:LL=&H77C1:LH=&H77
C3:SL=&H77C7:SH=&H77C5:WT=&H77C9:FL=&H7625:PT=&H774165 POKESL,0:POKESL+1,38:POKE
SH,0:POKESH+1,45:POKELL,1.POKELL+1,244:POKELH,7:POKELH+1,208
70 AUDIOON:CLS
80 PRINT@96,STRING$(32,150)
90 PRINT"   ********* SSTV **********"
100 PRINT"   ********** BY ***********"
110 PRINT"   **** GORDON THURSTON ****"
120 PRINT@288,STRING$(32,150)
130 IFINKEY$=""THEN130
131 GOSUB135:GOTO250
135 S$="CLEAR"+CHR$(150)+"W"+CHR$(94)+CHR$(10)+"AT"
140 CLS:PRINT"R - RECEIVE PIC
150 PRINT"C - CHANGE CONSTANTS
160 PRINT"F - FILTER PICTURE
170 PRINT"L - LOAD PICTURE
180 PRINT"M - MENU
190 PRINT"P - PRINT PICTURE
200 PRINT"R - RECEIVE PICTURE
210 PRINT"S - SAVE PICTURE
220 PRINT"V - VIEW PICTURE
230 PRINT"W - WAIT FOR S TICS
231 PRINT"" - VIEW TOP OF PIC
239 PRINT"A - AUTO TAPE MAKE CONNECTIONS
234 PRINT"T - TRANSMIT PICTURE"
235 PRINT"<CLEAR> - EXIT TO M.L"
239 RETURN
250 A$=INKEY$:IFA$=""THEN250
260 ONINSTR(1,S$,A$)GOSUB300,400,500,600,700,800,810,820,830,840,850,860,870
270 GOTO250
300 CLS CHANGE
310 PRINT"L1 - SYNC",PEEK(L1):PRINT"L2 - BLACK",PEEK(L2):PRINT"L3 - DK GREY",PEE
K(L3):PRINT"L4 - MD GREY",PEEK(L4):PRINT"L5 - LT GREY",PEEK(L5):PRINT"SP - SPACI
NG",PEEK(SP)
320 PRINT"SL-NC DET PARAMETERS":PRINT"LL - LNLNGTH LO",FNP(LL):PRINT"LH - LNLNGTH
 HI",FNP(LH):PRINT"SL - SYNCLN LO",FNP(SL):PRINT"SH - SYNCLN HI",FNP(SH)
335 PRINT"BRIGHTNESS - BL - BH
336 PRINT"CONTRAST   - CH - CL
340 INPUT"PARAMETER";N$:INPUT"CHANGE TO";N
341 IFN$=""THEN CLS:PRINT"CHANGED":RETURN
360 IFN$="L1"THENPOKEL1,N
361 IFN$="L2" THENPOKEL2,N
362 IFN$="L3"THENPOKEL3,N
363 IFN$="L4"THENPOKEL4,N
364 IFN$="L5"THENPOKEL5,N
365 IFN$="LL"THEN M=LL:GOSUB390
366 IFN$="LH"THEN M=LH:GOSUB390
367 IFN$="SL"THEN M=SL:GOSUB390
368 IFN$="SH"THEN M=SH:GOSUB390
369 IFN$="SP"THENPOKESP,N
370 IFN$="CH"THENPOKEL2,31:POKEL3,30:POKEL4,29:POKEL5,28
371 IFN$="CL"THENPOKEL1,37:POKEL2,31:POKEL3,29:POKEL4,27:POKEL5,24
372 IFN$="7"THENPOKESP,21
373 IFN$="8"THENPOKESP,23
374 IFN$="12"THENPOKESP,37
375 IFN$="BL"THENFORA=&H7536 TO&H753A:POKEA,PEEK(A)-N:NEXT
376 IFN$="BH"THEN FOR A=&H7536 TO&H753A:POKEA,PEEK(A)+N:NEXT
379 GOTO300
390 POKEM,N/256:POKEM+1,FNPO(N):RETURN
400  FILTER
410 SCREEN1,1:EXEC&H7625:SOUND50,1.RETURN
500 'LOADPIC
510 CLS:INPUT"LOAD PIC";A$,IFL$=""THENRETURNELSE SCREEN1,1:LOADM"+L$+"/PIC":RETURN
600  MENU
605 GOSUB140:RETURN
700 SCREEN1,1:EXEC&H7741:POKE&H6F,0:SOUND100,1:RETURN
800  RECEIVE
810 CLS:INPUT"SAVE PIC";L$,IFN$=""THENRETURNELSE SCREEN1,1:P=PEEK(&HBC)*256:SAVE
M"+L$+".PIC",P,P+&H1E00,0:RETURN
820 SCREEN1,1:RETURN
830 CLS:PRINT"WAITING FOR SYNC"
831 POKE&HFF21,PEEK(&HFF21)OR8.EXEC&H7FF9
832 IFINKEY$=""THENGOSUB860:GOTO831
833 MOTOROFF:RETURN
840 PMODE4,2:SCREEN1,1:RETURN
850 PMODE4,1:SCREEN1,1:RETURN
860 'ERIF.OFF:CLS:PRINT"WAITO TO DISK"
861 E EC&H7FC9:IFINKEY$=""THENRETURNELSEGOSUB896:MOTOROFF
862 IFINKEY$=""THENP=PEEK(&HBC)*256:N$=RIGHT$(STR$(PC),LEN(STR$(PC))-1):SAVEM"
+L$+".PIC",P,P+&H1E00,0:POKE&HFF40,0:PC=PC+1:GOTO861ELSEMOTOROFF:RETURN
870 E.EC&H7B4F.E.EC&H7B4F.RETURN
896 POKE&HFF21,PEEK(&HFF21)ORB:PMODE4,1:SCREEN1,1:PCLS:PMODE4,5:PCLS:PMODE4,1:EX
EC&H7559:MOTOROFF.RETURN
1000 DATA 75,23,0,53,17,169,37,31
1010 DATA 39,27,24,43,214,29,224,92
1020 DATA 39,17,33,15,116,255,32,37
1030 DATA 246,96,39,7,33,5,116,255
```

```
1040 DATA 32,36,246,57,198,2,126,117
1050 DATA 164,150,188,95,31,1,252,117
1060 DATA 61,51,139,255,117,59,26,80
1070 DATA 134,253,183,255,2,48,136,224
1080 DATA 48,136,32,51,136,32,255,117
1090 DATA 52,182,255,0,132,64,16,39
1100 DATA 0,146,134,1,167,132,127,117
1110 DATA 51,198,1,141,178,241,117,54
1120 DATA 35,247,198,1,141,169,241,117
1130 DATA 54,34,247,95,16,142,0,229
1140 DATA 49,63,38,252,141,153,247,117
1150 DATA 48,251,117,51,247,117,51,43
1160 DATA 163,127,117,50,246,117,48,241
1170 DATA 117,55,165,136,32,241,117,57
1180 DATA 165,132,241,117,56,165,136,32
1190 DATA 241,117,58,165,132,36,29,48
1200 DATA 1,188,117,59,39,62,134,1
1210 DATA 167,132,188,117,52,39,145,182
1220 DATA 117,51,176,117,49,183,117,51
1230 DATA 42,16,32,26,198,0,251,117
1240 DATA 50,247,117,50,30,136,30,136
1250 DATA 32,229,198,7,251,117,50,247
1260 DATA 117,50,30,136,32,174,198,9
1270 DATA 251,117,50,140,170,170,16,140
1280 DATA 170,170,32,144,57,255,255,255
1290 DATA 255,255,255,20,192,14,0,255
1300 DATA 0,43,224,44,0,150,188,95
1310 DATA 31,1,51,137,29,224,255,118
1320 DATA 33,51,132,255,118,29,51,201
1330 DATA 30,0,255,118,35,51,136,32
1340 DATA 255,118,27,134,128,95,141,54
1350 DATA 141,67,23,0,91,141,62,141
1360 DATA 45,141,43,23,0,140,141,46
1370 DATA 141,44,141,42,141,40,188,118
1380 DATA 27,30,226,188,118,33,30,5
1390 DATA 190,118,29,134,64,188,118,35
1400 DATA 38,1,57,48,136,32,51,136
1410 DATA 32,255,118,27,32,199,73,36
1420 DATA 3,48,31,73,73,57,70,36
1430 DATA 3,48,1,70,57,16,142,0
1440 DATA 6,48,136,192,141,63,141,238
1450 DATA 16,142,0,6,48,137,255,64
1460 DATA 141,51,141,236,48,136,128,57
1470 DATA 16,142,0,2,48,136,192,141
1480 DATA 35,48,136,64,16,142,0,2
1490 DATA 141,27,141,202,48,137,255,64
1500 DATA 16,142,0,2,141,15,48,136
1510 DATA 64,16,142,0,2,141,6,141
1520 DATA 181,48,136,128,57,165,132,39
1530 DATA 1,92,48,136,32,49,63,38
1540 DATA 244,57,203,4,84,84,84,48
1550 DATA 136,32,52,2,68,170,132,167
1560 DATA 132,166,228,90,42,7,68,168
1570 DATA 132,167,132,166,228,48,136,224
1580 DATA 170,132,167,132,166,228,90,42
1590 DATA 6,168,132,167,132,166,228,48
1600 DATA 136,32,170,132,167,132,166,228
1610 DATA 90,42,6,168,132,167,132,166
1620 DATA 228,48,136,224,68,170,132,167
1630 DATA 132,166,228,90,42,7,68,168
1640 DATA 132,167,132,166,228,53,2,57
1650 DATA 2,255,255,255,255,43,225,43
1660 DATA 225,134,254,151,111,134,41,151
1670 DATA 150,150,188,95,31,1,195,29
1680 DATA 225,253,119,63,48,136,31,51
1690 DATA 137,29,224,255,119,61,134,27
1700 DATA 173,159,160,2,134,71,173,159
1710 DATA 160,2,134,26,173,159,160,2
1720 DATA 134,27,173,159,160,2,134,73
1730 DATA 173,159,166,2,134,0,173,159
1740 DATA 160,2,134,239,173,159,160,2
1750 DATA 166,132,67,173,159,160,2,166
1760 DATA 31,67,173,159,160,2,48,136
1770 DATA 32,188,119,61,38,234,182,255
1780 DATA 0,132,64,39,11,188,119,63
1790 DATA 39,6,48,137,226,39,32,167
1800 DATA 134,27,173,159,160,2,134,30
1810 DATA 173,159,160,2,57,255,255,255
1820 DATA 0,1,244,7,208,0,45,0
1830 DATA 38,206,0,0,255,119,191,255
1840 DATA 119,191,134,253,183,255,2,23
1850 DATA 253,101,18,198,1,23,253,95
1860 DATA 182,255,0,132,64,39,81,241
1870 DATA 119,200,43,77,241,119,198,36
1880 DATA 75,79,253,119,191,247,119,189
1890 DATA 198,3,33,45,23,253,64,182
1900 DATA 255,0,132,64,39,50,84,116
1910 DATA 119,189,251,119,189,247,119,189
1920 DATA 241,119,200,43,20,241,119,198
1930 DATA 42,15,79,243,119,191,253,119
1940 DATA 191,198,5,33,4,31,136,32
1950 DATA 211,252,119,191,16,179,119,193
1960 DATA 43,151,16,179,119,195,42,145
1970 DATA 57,188,170,170,33,250,33,248
1980 DATA 33,246,198,3,32,151,255,0
```

CH changes to high contrast.

CL goes back to normal.

L1 sets the level below which the synchronous levels are detected

L2 to **L5** set the levels of gray.

BH <enter> and a number (try 2) changes the level of brightness the computer sees.

BL just the opposite.

SH and **SL** set the levels between which the synchronous detect portion works. Spacing sets the time of each line.

LL and **LH** set the length of synchronous pulse detected

These parameters have been included for experimenting, and the program works well without changing then in most cases.

The voice portion of the transmission is used for tuning, and the slow-scan should then be right. If it is saved to tape, it can be used again and again and the parameters changed to see their effects.

F Filter runs a Machine Language program to average the pixels around it. It does not work well, but its effect is interesting.

L Load picture from disc.

M return to Menu.

P send Picture to Printer. This works with DMP 110 printer and probably others.

R Receive picture does not wait for synchronous pulse.

S Saves the picture.

The voice portion of the transmission is used for tuning, and the slow-scan should then be right. If it is saved to tape it can be used again and again, and the parameters changed to see their effects.

V View picture on screen.

W Wait for synchronous pulse so that picture starts at top of the screen.

▲ (UP ARROW) view lower portion of screen out of view (usually not needed).

CLEAR causes an exit from any Machine Language that might be running. It may not exit if there is not any audio applied.

T Transmit sends two frames to the cassette output lead. This should be filtered before applying it to the microphone input on the transmitter. The remote control lead can be used to key the transmitter. Transmitting is probably the hardest part, as there are a few leads, and some audio switching needed for the microphone. (I have only tried this once and did not have a microphone connector, so I recorded the sound on tape and put the microphone to the tape recorder. It worked, but does leave a lot to be desired)

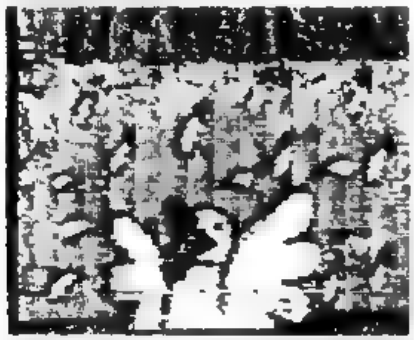
The machine code is poked to memory from data statements, and could be saved as a Machine Language program to speed loading, but this is the easiest way to publish it. It takes a few seconds to poke to memory.

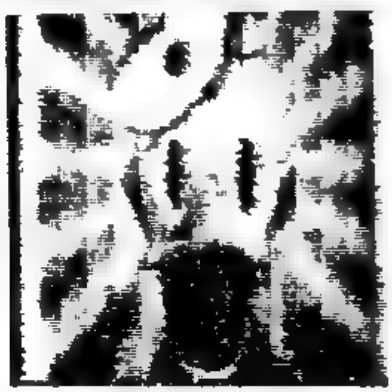
Sometimes, the program locks on printing, and re-setting, and a *goto50* gets back into the program. The printer works on the second try. (I have not figured that one out yet!)

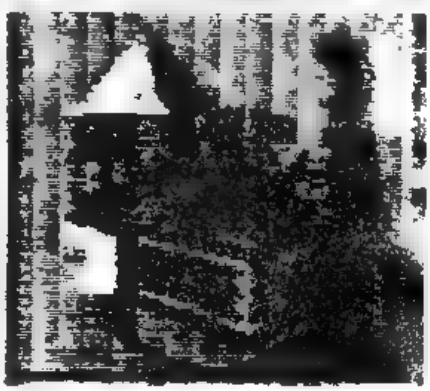
There is a lot of typing involved, but I feel it is well worth it. If anyone is interested in the program on tape, send a blank tape and sufficient return postage, and I would be pleased to copy the program to it. (This also applies for a disc as well).

The source code is available for the cost of return postage upon request.

```
1990 DATA 3,24,43,224,43,224,33,127
2000 DATA 120,72,150,188,95,31,1,51
2010 DATA 137,31,224,255,120,76,51,136
2020 DATA 32,255,120,74,198,128,134,253
2030 DATA 183,255,2,134,82,183,120,71
2040 DATA 26,80,[redacted],0,36,127,255,32
2050 DATA 125,120,71,16,38,0,199,125
2060 DATA 120,72,42,18,182,120,72,187
2070 DATA 120,73,183,120,72,84,84,36
2080 DATA 16,86,48,1,32,14,18,33
2090 DATA 220,16,140,170,170,18,18,30
2100 DATA 136,18,30,136,79,229,132,39
2110 DATA 3,76,32,3,18,33,245,229
2120 DATA 136,32,39,3,76,32,3,18
2130 DATA 33,234,84,229,132,39,3,76
2140 DATA 32,3,18,33,203,229,136,32
2150 DATA 39,3,76,32,3,18,33,212
2160 DATA 16,142,121,85,166,166,183,120
2170 DATA 78,68,128,9,23,0,123,30
2180 DATA 136,30,136,33,144,134,128,183
2190 DATA 255,32,125,120,71,38,90,84
2200 DATA 36,5,48,1,86,32,3,18
2210 DATA 30,136,182,120,72,176,120,78
2220 DATA 187,120,73,183,120,72,182,120
2230 DATA 78,68,64,187,120,78,128,5
2240 DATA 23,0,71,18,188,120,74,16
2250 DATA 38,255,90,127,255,32,188,120
2260 DATA 76,39,70,48,136,32,51,136
2270 DATA 32,255,120,74,33,59,134,11
2280 DATA 183,120,71,198,128,127,120,72
2290 DATA 134,17,32,160,18,134,18,18
2300 DATA 122,120,71,16,140,0,0,32
2310 DATA 147,134,18,18,122,120,71,16
2320 DATA 140,0,0,32,187,33,30,28
2330 DATA 26,23,74,30,136,16,131,170
2340 DATA 170,74,38,247,30,136,37,53
2350 DATA 144,57,0,0,0,2,16,252
```







VARIABLE FREQUENCY ANTENNAS

Emil Barkovic VK5NMT
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For the last three years, the author has been experimenting with variable antennas. He finds it very convenient to have just one antenna and be able to operate on all wanted frequencies with a low SWR.

The antenna can cover a wide range of frequencies, and may be vertical or horizontal. Antennas as shown in the drawings have been tested and found to operate between 3.5 and 30 MHz. However, the same principle can be extended to a much wider range of frequencies, to which the limits have not yet been established.

The vertical antenna is only three metres long when fully extended. A similar portable model is only 2.2 metres long. The antenna is very practical for marine mobile or portable use on top of a car roof-rack or caravan. The antennas will not withstand high speed travelling, so cannot be used for land mobile applications. They must be removed from the vehicle or laid against the roof in these cases.

Patents have been applied for with the Australian Patent Office in January 1984. The inventor hopes to be able to manufacture these antennas in the near future, but is willing to allow individual amateurs to build their own. To this end, the drawings illustrate the concept rather than the precise dimensions and method of assembly.

Further information on constructional details can be provided by the author if required.

LEGEND OF FIGURES 1 AND 2

Figure 1 is a variable vertical antenna.
Figure 1a is the brush assembly used on vertical and horizontal antennas.
Figure 2 is a variable horizontal antenna. An SWR of 1.0 is obtainable with this antenna on all frequencies within its range.

1 The coil and tube element assembly, which consists of 40 metres of copper wire, helically wound on a rod or tube. The wire is one millimetre in diameter on home base antennas, but on the portable model I have used 0.7 mm diameter wire.
2 Aluminium tube.
3 The brush assembly which consists of 0.5 mm brass shim cut as shown in Figure 1a, then rolled around the tube 2 and held in place by PVC sleeve 4 and two screws.
4 PVC sleeve.
5 A spring or neoprene O-ring is used to hold the brushes against the turns of the coil.
6 Coaxial cable.
7 Pipe supporting the antenna. On the vertical antenna a steel pipe is used but on the horizontal antenna, fibreglass is used.
8 Clamp.
9 Push rod, connected to tube 2 for either extending or retracting the antenna. On the horizontal antenna two six millimetre fibreglass rods are used and connected to a common rod at the mast.

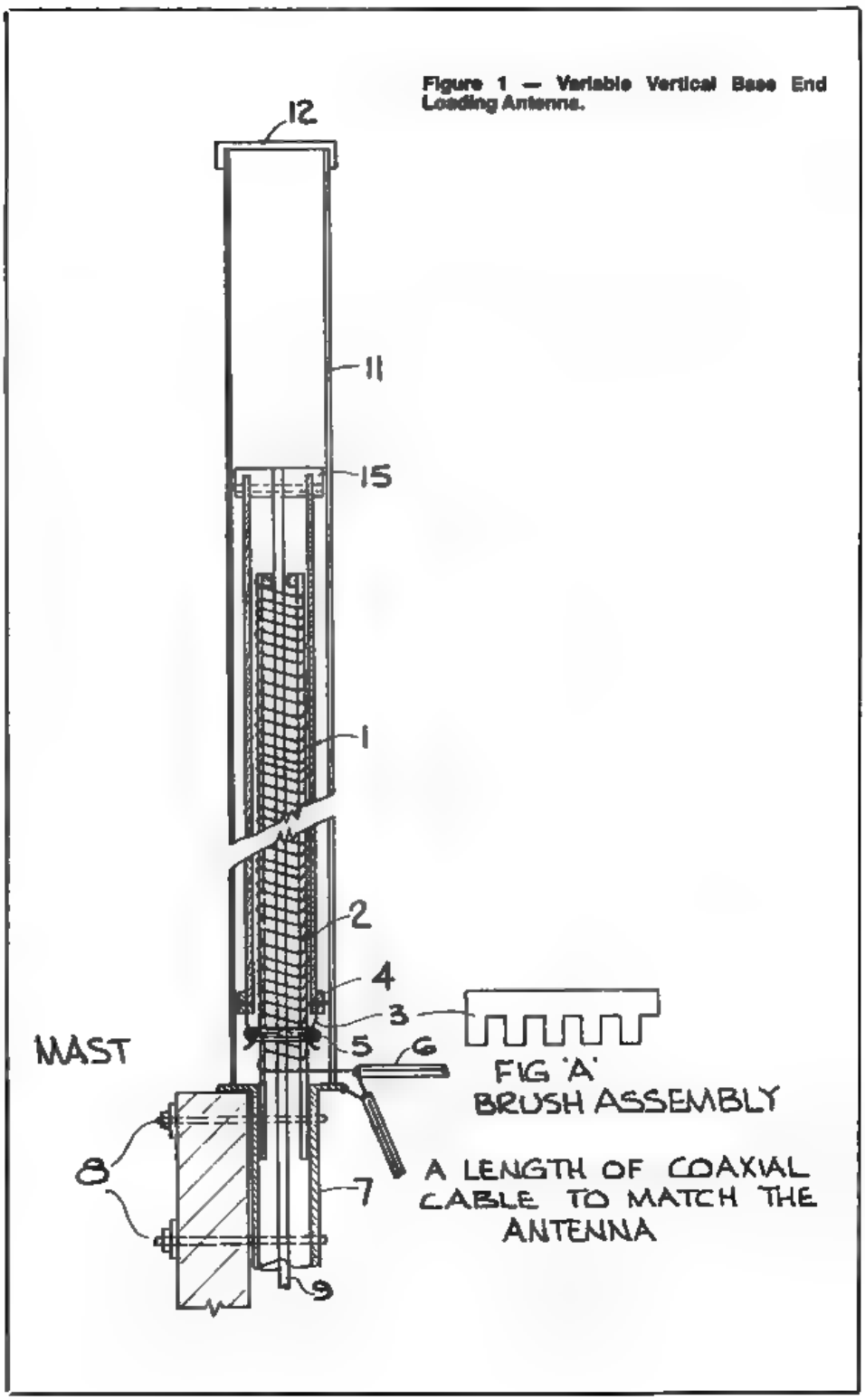


Figure 1 — Variable Vertical Base End Loading Antenna.

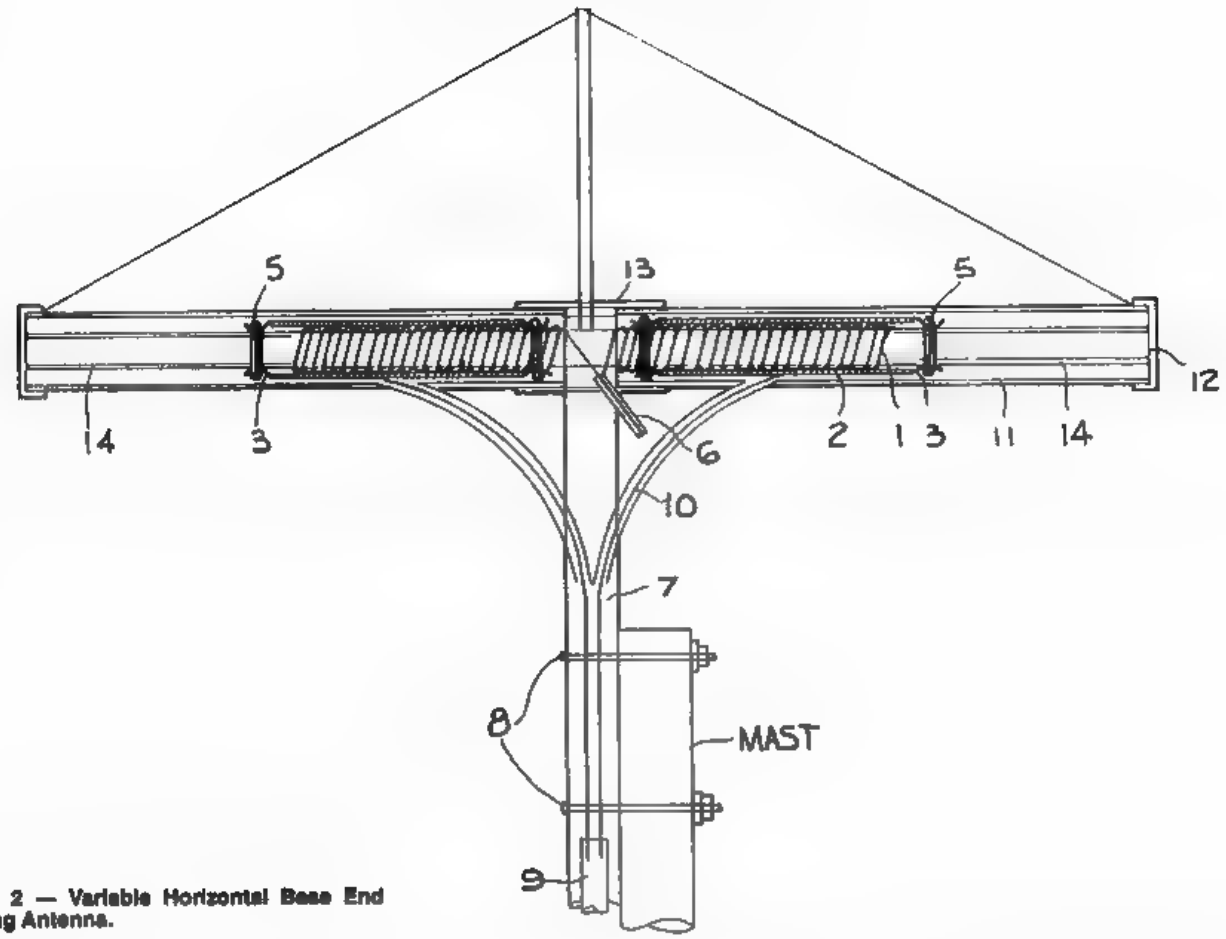


Figure 2 — Variable Horizontal Base End Loading Antenna.

10 Two PVC push rod guides (used on horizontal antenna only).
11 PVC weather shield.
12 PVC weather shield cap.
13 PVC sleeve.
14 Aluminium tube used on horizontal antenna only. The tube is used to give the antenna drive element a fixed length. Further experimenting will be carried out by adding director and reflector elements to the antenna to find how directional the antenna will become.
15 Bush used to connect rod 9 to tube 2

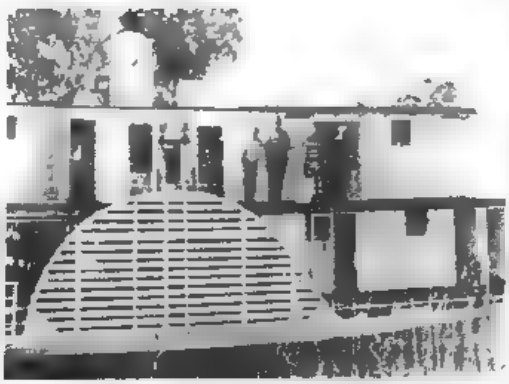
PS INDUSTRY & VI5JSA

A special event amateur radio station set-up on the Paddle Steamer PS *Industry* on September 19-22, was a great success with 327 contacts being made.

Awards were available for all amateurs contacting the station. The event was organised in conjunction with the Jubilee 150 celebrations.

—Adapted from *The Murray Pioneer*, Friday September 26, 1986 and supplied by Doug Tamblyn VK5PDT

Operating VI5JSA Special Event Station on the PS *Industry* from left: Kingsley VK5NOU, Doug VK5PDT, Hugh VK5BC (with microphone), and John VK5ARK (keeping the log).



Kingsley Brain VK5NOU, and Doug Tamblyn VK5PDT, erecting the antennas in preparation for VI5JSA aboard the PS *Industry*.

Kingsley Brain VK5NOU, John Ruston VK5ARK, Hugh Lloyd VK5BC and Doug Tamblyn outside the Operations Room.

Leo McNamara and Roger Harrison

Predicting the size of the next maximum of the solar cycle

Kiss your last big solar maximum goodbye!

The solar cycle — that 11-year recurrence of activity on the sun delineated by an outbreak of 'spots' on its 'face' — is a familiar, but often mystic, phenomena to radio communicators the world over. Radio amateurs, shortwave broadcasters, HF network operators, space engineers, geophysicists and communications engineers variously exploit it, curse it and muse over it. In the past, efforts at predicting it have not been too successful. But recent work has given good results. So what's the forecast?

This article is published, by special arrangement, simultaneously in the January 1987 issues of *Amateur Radio* magazine and *The Australian Electronics Monthly*.

KISS YOUR LAST big solar maximum goodbye! For the many thousands of radio amateurs and shortwave listeners the world over who were active over the period of the last solar maximum, between 1978 and 1982, count yourselves lucky for it is unlikely you'll ever experience the phenomenal propagation conditions again in your lifetime. For those who were also around earlier, during the 1956-61 maximum, count yourselves especially lucky; that was the largest maximum ever recorded.

There have been numerous attempts over the years to predict the size and timing of upcoming solar maxima. Until recently, it was more miss than hit. This article pulls together the threads of recent work on solar cycle prediction, which says that we can expect a maxima around 1990 a little lower than that experienced in 1969.

Background on the solar cycle

Sunspots are small dark patches that appear on the visible surface (the 'photosphere') of the sun. They appear dark because they are somewhat cooler than their surroundings. The earliest recordings of sunspots seen with the naked eye go back to the first century BC when the Chinese observed them. It was Galileo however, who made the first systematic observations of sunspots, starting in 1610 just after the invention of the telescope. His observations occasioned some controversy at the time.

While sunspot observations on some sort of scientific basis extend from Galileo's time, reliable systematic observations commenced in the mid-1800s. A German amateur astronomer, Henry Schwabe, noted in 1843 what appeared to be a 10-year cycle in the number of sunspots, based on observations he'd made over the preceding 17 years. Until that time, periodicity in sunspots had not been noticed despite some 200 years of telescopic observations. Shortly after, Rudolf Wolf of the Zurich observatory organised a program of solar observations among professional astronomers that extended world-wide. A similar program continues still. It was Wolf who, from a search on earlier sunspot data, concluded that the average solar cycle period was around 11 years. Wolf's definition of "sunspot number" is in use to this day. However, the literature cautions that prior to 1850, sunspot data is inferior and unreliable. John A Eddy of the US National Centre for Atmospheric Research, categorises the data from 1852 to 1618 as good, from 1617 to 1750 as fair and from 1749 to 1700 as poor.

There is evidence that the solar cycle is much older, though. Searches for periodic variations in tree-ring records and other paleoclimatic data, while throwing up a rich and formidable array of data, have not shown evidence of any 11-year periodicity or any positive link between solar activity cycles and terrestrial climate until recently, however. An article on "The Solar Cycle in Precambrian Time" by George E Williams, in *Scientific American* August 1986, shows distinct evidence of cycles in laminated sandstones and siltstones from the Elatina formation in South Australia that have characteristics paralleling, if not matching, the characteristics of sunspot cycles. These precambrian rocks were laid down some 680 million years ago and Williams argues that the data implies that the sun's activity has changed little since that time.

The sunspot cycle has a mean period of 11.1 years, with a minimum period of about eight years and a maximum period of around 14 years. The rise to the peak is shorter than the fall to the minimum. The height of the peaks varies from lows of about 60 to an all-time high of 190 in 1957, and apparently follow a longer period of seven or eight 11-year cycles which was first noted by Wolf, more recently studied by W Gleissberg, detailed in a paper published in 1944. These longer cycles are now known as The Gleissberg Cycle. The minima seldom reach zero, averaging around six.

Sunspot numbers

In following up Schwabe's observation on a possible solar cycle, Wolf devised a method of counting sunspots and sunspot groups, giving rise to the term "sunspot number". The Wolf sunspot number, R, counts the individual spots and the number of spot groups, making one sunspot group as important as 10 individual spots. The sunspot number is expressed as a weighted sum, as follows.

R = 10 x No of spot groups + number of individual spots

The sunspot number will be zero when no spots are apparent, 11 with one sunspot (which is also regarded as one group) and may range as high as 250 (which has been observed).

Predicting the size of the next maximum

There are many good reasons for trying now to estimate how high the sunspot number will go at the next peak of the solar cycle, expected in around 1990. We saw in July 1979 the effect of the Marshall Space Flight Centre's very low forecast for the 1979/80 peak of cycle 21 — the mission to boost SKYLAB into a higher orbit was scheduled several years too late, and Skylab spread itself all over Western Australia. This was because the unexpectedly high level of solar activity, as indicated by the high sunspot numbers, heated and expanded the earth's atmosphere to such an extent that the atmospheric drag experienced by Skylab was much greater than predicted, and resulted in a premature decay of its orbit.

Atmospheric drag thus requires that all satellite mission planners have correct predictions of the general levels of solar activity so that they can estimate the lifetimes of their satellites, in order to know when to have the replacement satellites ready, when to line up their launch facilities, and so on. These are important financial decisions, and the competitiveness of the market place forces planners to take advantage of every available piece of information.

A similar situation exists in HF and satellite communications. Frequency Regulation Authorities in each country, and the international governing body, all require long-term estimates of the size of cycle 22 in order to be able to plan the allocation of frequencies in the HF band. These things are not done overnight, especially with the increasing pressures on the HF spectrum, which makes the task even more daunting.

A large system user who has to choose between HF and satellite communications for a new system would be heavily influenced by the predicted long-term levels of solar activity — provided he has a good measure of faith in these predictions. Higher levels of solar activity are more favourable to HF users because they give rise to higher MUFs, although they also bring with them an accompanying increase in the number of ionospheric storms caused by solar flares. Satellite users, on the other hand, are better off at lower levels of solar activity because of the diminished effects of the

ionosphere on the trans-ionospheric propagation of VHF-SHF signals (less refraction, shorter time delays, less scintillation, and so on).

This brings us to look at some techniques already being used to predict the value of the cycle 22 maximum in around 1990. I am going to describe three methods here. Broadly speaking, these can be described as "Historical perspective", "Recurrent geomagnetic activity" and "Mathematical methods".

Historical perspective

In a series of papers presented over the last few years, Tad Sargent of the Space Environmental Laboratories in Boulder, Colorado, has predicted that the next sunspot maximum will be in the range 90 to 100, somewhat lower than the average maximum over the last 13 cycles, which was 117.5. Flying in the face of convention, Tad has argued that we should not predict that the sun will do something that it has not been observed to have done before.

It sounds too simple to be important, but most operational forecasting is done on the basis of the concept of average behaviour. If our entire history of observations contains only two or three examples of the phenomenon we are trying to forecast, then the average value may be all the useful information we have. A good forecaster would start by considering the average behaviour and would then search for clues which may shade the forecast one way or the other from the average. It makes good sense to use this average as a starting point, but it also makes good sense to use any additional little bits of information to produce a better forecast, provided we think that we can interpret this information correctly. Tad has studied the last 13 cycles in some detail, to see what extra information can be gleaned from them, especially their variations about the average behaviour. Along with others in the field, Tad has much greater faith in data recorded after about 1840, which unfortunately leaves us with only 145 years of data, or about 13 cycles.

The data described here comes from one of Tad's papers. Table 1 lists the maxima and minima of cycles 9 to 21, along with the month and year in which they occurred, while Figure 1 shows the annual average sunspot numbers since 1750. Figure 1 is of particular interest because it illustrates the 80-90 year quasi-periodic changes in the heights of the maxima known as the Gleissberg Cycle. While a small amount of faith is required to accept the reality of the Gleissberg cycle as seen in Figure 1, other data such as auroral records confirm the reality of this so-called "secular" cycle. The current Gleissberg cycle must begin to end soon if the sun is to keep on doing what it has done in the past.

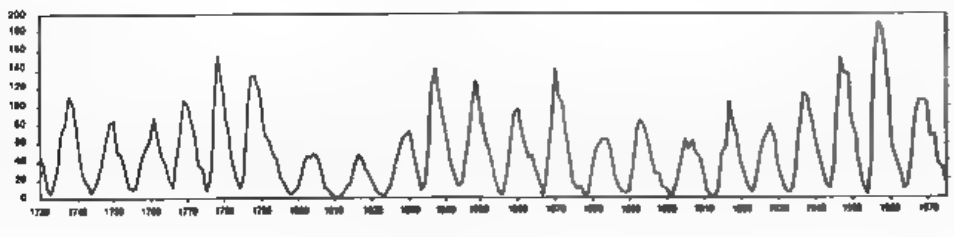


Figure 1.

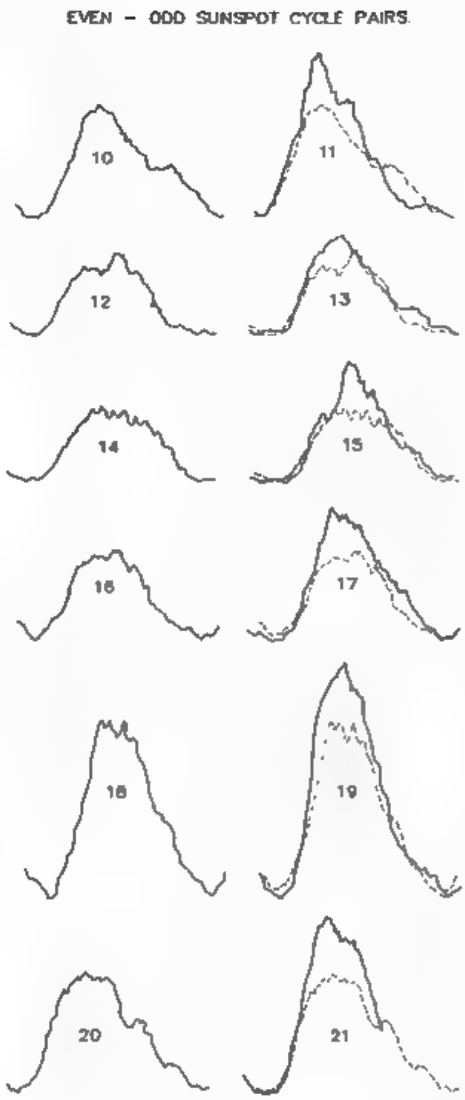


Figure 2.

Table 2 gives a listing of the ratios of odd-cycle to even-cycle amplitudes for the last 130 years. Remember that there is nothing magical about whether a cycle is odd or even, since this is determined by an accidental convention. What is important is that alternate cycles seem to be very similar to each other. Figure 2 shows that the even-numbered cycles look very much like the odd-numbered cycles that follow them, except that they are truncated — each even-numbered cycle looks like an odd-numbered cycle with its top knocked off. Table 2 shows that the maxima of the odd cycles are on average 1.44 times as great as those of the preceding cycle. We all know that the pattern could break at any time, but at present the assumption that the pattern will persist is a reasonable one. It would be easier to forecast the next cycle at this point if it were to be an odd-numbered cycle. However, since we are trying to forecast an even cycle, we have to stretch a little for the forecast.

The sub-table in the lower right-hand corner of Table 2 shows what values cycle 23 is likely to have, for particular values of cycle 22. As we can see, if cycle 22 is to be an average cycle of 117.5, we can expect cycle 23 to be as large as cycle 21. This poses a problem for us, because it says that cycles 22 and 23 would not even begin to end the current Gleissberg cycle. If the current Gleissberg cycle does not end until cycle 24, sometime around the year 2013 (1980 + 33), the current Gleissberg cycle will last longer than 100 years, even if it ends abruptly and does not taper off over several solar cycles. On the other hand, if cycle 22 goes to only 90 to 100, the implied maximum for cycle 23 establishes the trend towards a minimum in the Gleissberg cycle. Tad therefore concludes that cycle 22 needs to be at least as low as 90 to 100 in order to begin the end of the current Gleissberg cycle.

We can get another estimate for cycle 22 by considering the maxima for the even cycles which, as we have seen, seem to belong to a different group for the odd cycles. The numbers in Table 2 allow us to calculate the average maximum value for the even cycles 10 to 20 , which turns out to be about 96. Thus if we assume that cycle 22 will be a 'typical' even cycle, we can expect the peak to reach about 90 to 100.

Tad is therefore shooting for a value of 90 to 100. Given the flat tops of even cycles which we saw in Figure 2, we can expect the next maximum to cover the period 1990 to 1993, or thereabouts. Incidentally, Tad is going for a February 1988 minimum before cycle 22 starts up.

Recurrent geomagnetic activity

There is a group of sunspot number forecasting methods which rely on the relationship between the general level of geomagnetic activity during the decreasing years of a solar cycle with the sunspot number reached during the following sunspot maximum. Figure 3 shows the sunspot number for cycles 12 to 21 (solid lines) and the smoothed monthly mean aa indices of geomagnetic activity (dashed lines). Recall that most geomagnetic activity during the reclining phase of a cycle is due to recurrent storms associated with HSSWSs (see Radio Communicators Guide to the Ionosphere, *Australian Electronics Monthly*, August 1986, p 77).

It was the Russian, Alexander Ohl who pointed out the remarkable correlation between the average level of geomagnetic activity during the last three years of one sunspot cycle and the maximum amplitude of the next cycle. The cross- hatched areas in Figure 3 show the values of a variable depending on the index aa, which Ohl introduced. We can see that the cross-hatched areas do appear to relate very closely to the peaks of the

next cycle — the larger the cross- hatched areas, the higher the following cycle.

The correlation between the geomagnetic activity averages and the peak values of the succeeding cycle is an impressive 0.93. The Ohl method was used in 1977 to forecast the cycle 21 maximum, which it did fairly successfully (see Radio Communicators Guide to the Ionosphere, *Australian Electronics Monthly*, October 1985, p 106). Unfortunately we shall have to wait until we have reached the approaching minimum before we can obtain the Ohl geomagnetic parameter and make a reliable estimate for cycle 22 using the Ohl method.

It is possible to have a good guess at what the Ohl parameter will be, based on what has happened in the last year or so, and thence to estimate the corresponding value for the sunspot maximum for cycle 22. This has been done by various authors, who have also developed their own versions of the Ohl method. A group of experts at the Solar-Terrestrial Physics Workshop in Paris during 1984 came up with a consensus opinion that cycle 22 would be a little above average, but many have no doubt all changed their minds since then, as more geomagnetic observations have become available. We will not go any further into this group of forecasts here, since they really should not be made until we are sure that we have reached solar minimum.

Mathematical methods

The third class of forecasting methods we will describe here are almost purely mathematical, with no regard to the underlying physics of the situation. Cycle 21 saw the general abysmal failure of these methods, with the notable exception of Adolf Paul's Anharmonic Frequency Analysis (AFA) technique which was applied by Jay Hill and yielded a good estimate for the value of the maximum.

In a recent paper, Adolf has used an improved version of his AFA technique to forecast a sunspot number of around 100 for cycle 22. Adolf pays particular attention to the quality of the data he uses (cycles 9 to 21), and to the noise level in the data. Figure 4 shows Adolf's forecasts for the next three solar cycles — with declining peaks until at least the year 2040. The noise level is about ± 20.

Adolf's mathematical techniques are not for the faint-hearted (including the present writer), but they have been shown to be very powerful in the analysis of other data such as tide heights, and do not suffer from the defects of some other techniques when applied to real (noisy) data. Adolf is at the Naval Ocean Systems Centre in San Diego.

Conclusion

Much has already been written, and more will continue to be written, about the sunspot maximum of cycle 22. We have just scratched the surface here, but the bottom line is that we can expect a below-average cycle for cycle 22, with the sunspot number reaching only 90 to 100. In all probability, the following two cycles will be even lower. It is comforting to see that methods as disparate as Tad's and Adolf's agree about the size of cycle 22, and also that the current Gleissberg cycle appears to be on the decrease.

ABOUT THE AUTHORS

Leo McNamara

Leo obtained a BSc from the University of Queensland in 1961, BSc (Hons) in 1964 and his PhD in 1969. Subsequently, he gained MSc & Soc from the University of NSW in 1979. Leo's PhD was in solar physics. He worked as a post-doctoral research associate at the University of Colorado during 1969-70, in the Joint Institute for Laboratory Astrophysics. From 1970 through 1979, Leo was Head of the Ionospheric Prediction Service low-latitude (equatorial ionosphere) research section.

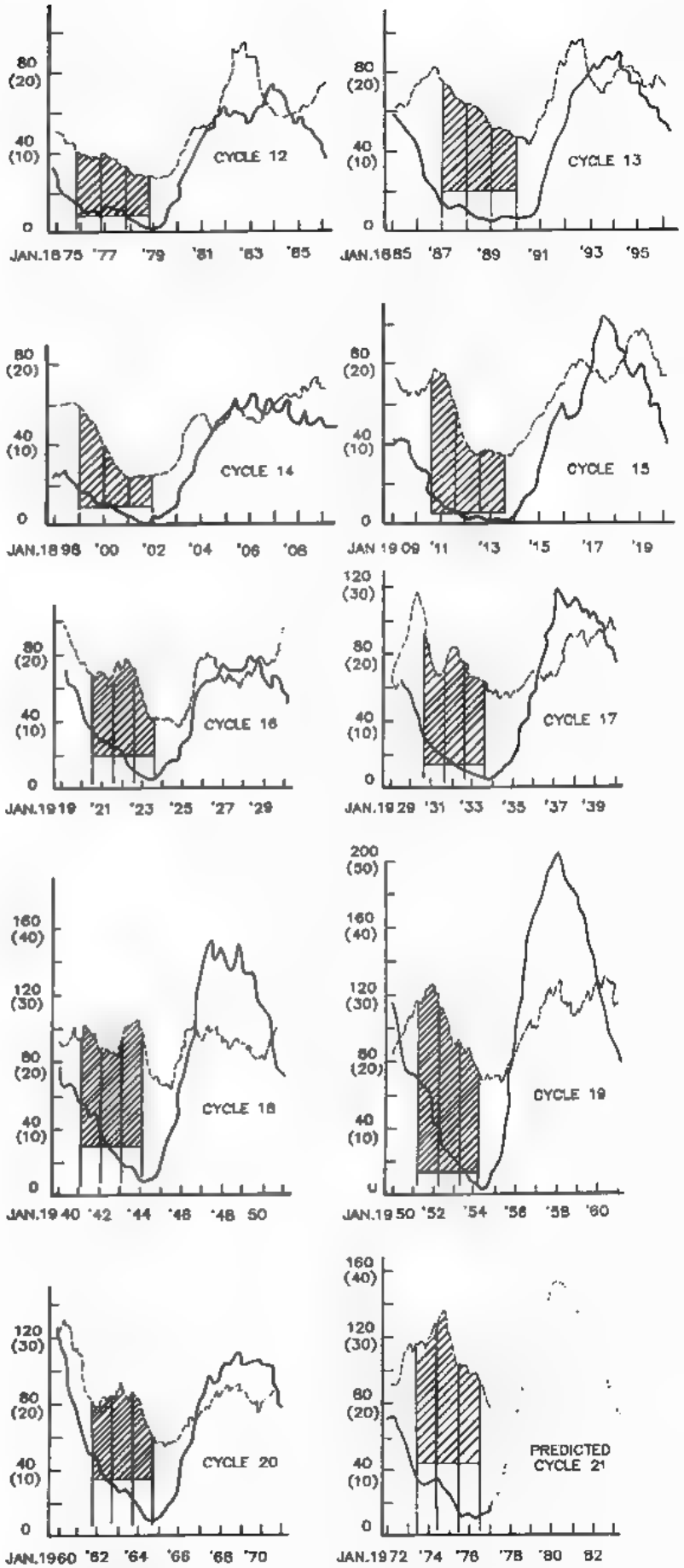
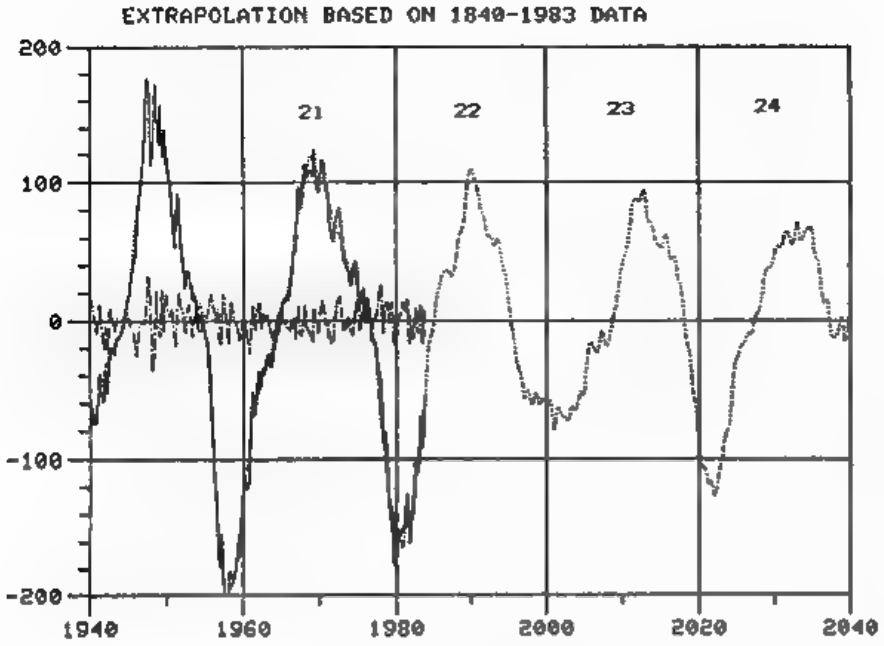
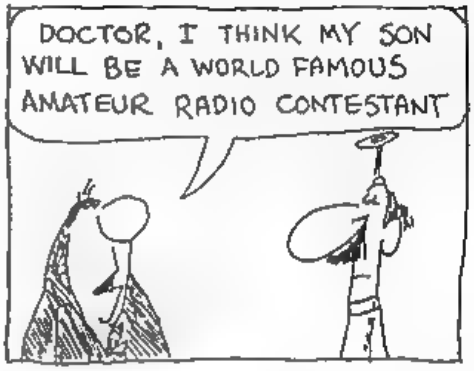
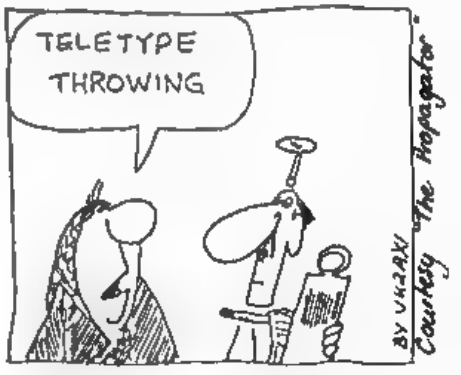


Figure 3.







Roger Harrison worked w th him during 1971-73 on transequatorial propagation.

During 1977-78, Leo again worked at the University of Colorado, as Visiting Scientist at the World Data Centre for Solar-Terrestrial Physics. Upon his return in 1979, he was appointed Head of the Prediction Section at the Ionospheric Prediction Service Radio and Space Services, part of the Department of Science. During 1982-83 he worked in America again, this time at the US Air Force Geophysics Laboratory in Boston, Ma.

During late 1985 — early 1986, he worked at Lowell Un versity, Ma Returning to Australia in 1986, Leo took up his current position with Andrew Antennas in South Australia.

Leo is widely known among the international scientific community through his work on various committees. He is a prolific author, with some 58 papers to his credit, many appearing in international scientific and engineering journals such as Nature, Australian Journal of Physics, Radio Science, Advances in Space Research etc. Together with Roger Harrison, Leo has authored The Radio Communicators Guide to the Ionosphere', current y being serialised in The Australian E ectronics Monthly, soon to be published as a book. Aside from his prolific print output, Leo is an accomplished lecturer.

Leo is married with two children. He lists his hobbies as "doing nothing".

Roger Harrison VK2ZTB

Probably one of Australia's best-known amateurs, Roger gained his licence as VK3ZRY in 1963. An inveterate 'builder/modifier' in those years, Roger was prevailed upon to write-up some of his more notable efforts for *Amateur Radio*. His first article, "Some Six Metre Antennas" appeared in AR in 1964, sowing the seeds for what became a career in technical writing/journalism.

He pursued a course in Communications Engineering at RMIT during the 1960s, taking a sharp left turn in 1970 when he joined the 1970 ANARE exped tion to Casey base, Antarctica, conducting a geophysical survey. He operated under AX0GR there, the call sign of the late Heinz Gehrke VK5GR.

Returning in 1971, Roger moved to Sydney and changed his call sign to VK2ZTB. As he always maintained a strong interest in propagation since his SWL days in the late '50s, it seemed only natural he should join the Ionospheric Prediction Service where he worked with Leo McNamara on transequatorial propagation from 1971 to 1973. His classic two-part article on "Transequatorial VHF Propagation" published in AR in 1972 has been published in several languages around the world. From 1973 to 1976 he worked on the development of a solid-state ionospheric sounder for the IPS, and wrote the handbook for it.

Roger was instrumental in having six metre beacons established by IPS at Casey and Mawson in 1971, and was an author of the seminal 1971 VK2 VHF Group 'Beacon Manifesto', along with Mike Farrell VK2AM and Rod Graham, then VK2ZQJ. This document established the fundamental parameters of the Australia-wide network of beacons and the beacon bandplans.

From 1971 through 1976, Roger was a major contributor to journals such as 73 Magazine, Ham Radio and ETI (Australian edition). Roger is also known from the VHF-UHF journal 6UP he and his wife Val published during the '70s. 6UP was revived recently by Roger, in partnership with Andrew VK2YLA. From 1976 to 1979, he worked as a full-time freelance technical journalist, amongst other things editing a CB magazine. From 1979 through 1984, he edited ETI. In 1985, Roger launched The Australian Electronics Monthly, which he partly owns and is currently the Editor.

Roger has had, over the years, written and had published hundreds of articles, papers and technical notes in journals all over the world. He is a widely sought after lecturer and speaker and regularly addresses meetings and seminars.

Write an Article for AMATEUR RADIO!

THE TDM 80 METRE CW TRANSCEIVER

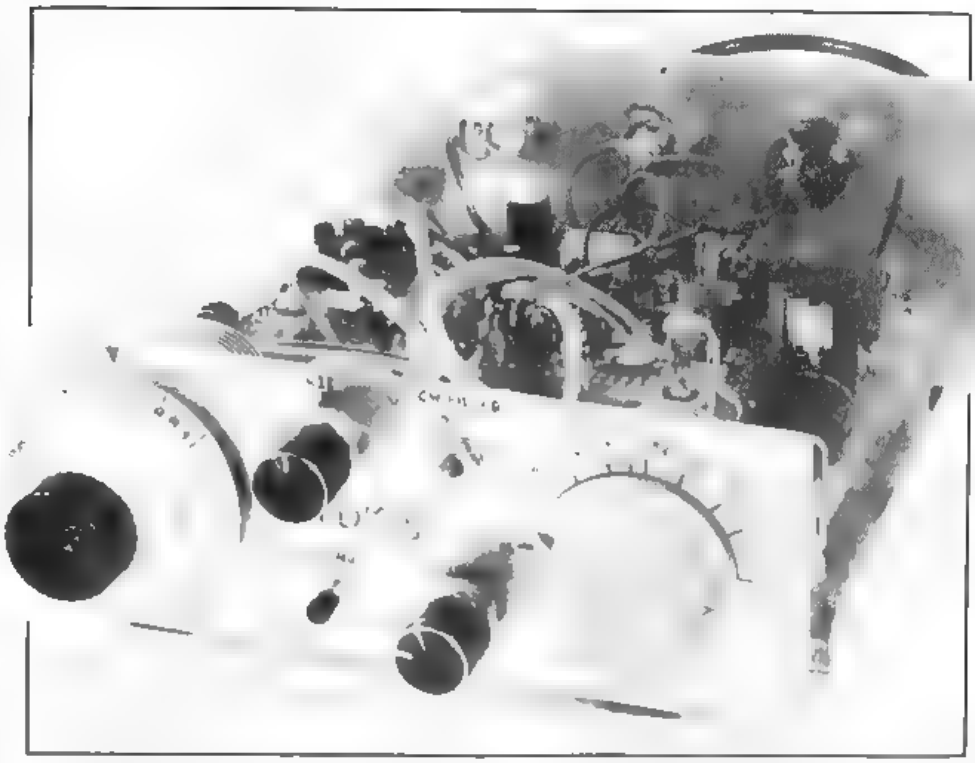
Ian Smith VK7IJ
101 Flinders Esplanade, Taroona, Tas. 7006

Here is a way to get "on-air" relatively cheaply with a "tried and tested" transceiver.

The low power transceiver described below was born out of economic necessity. It is presented so that others may have the pleasure of both constructing and using home-made equipment.

The unit features:

Variable Frequency Oscillator (VFO)
Direct Conversion Receiver (DC)
Receive Incremental Tuning (RIT)
CW Filter
Side-tone Generator
Automatic Aerial Change-over, Receive to Transmit
Automatic Receiver Audio Mute with Semi-Break in
Push Button Zero Beat Transmit Frequency Set
1.5 watts RF Output Power
8 ohm Audio Output Impedance for Loudspeaker or Headphones
Low, 30 mA Receiver Standing Current
Single Printed Wiring Board Construction
Minimal Alignment and Test Equipment Requirements
Uses Standard Components

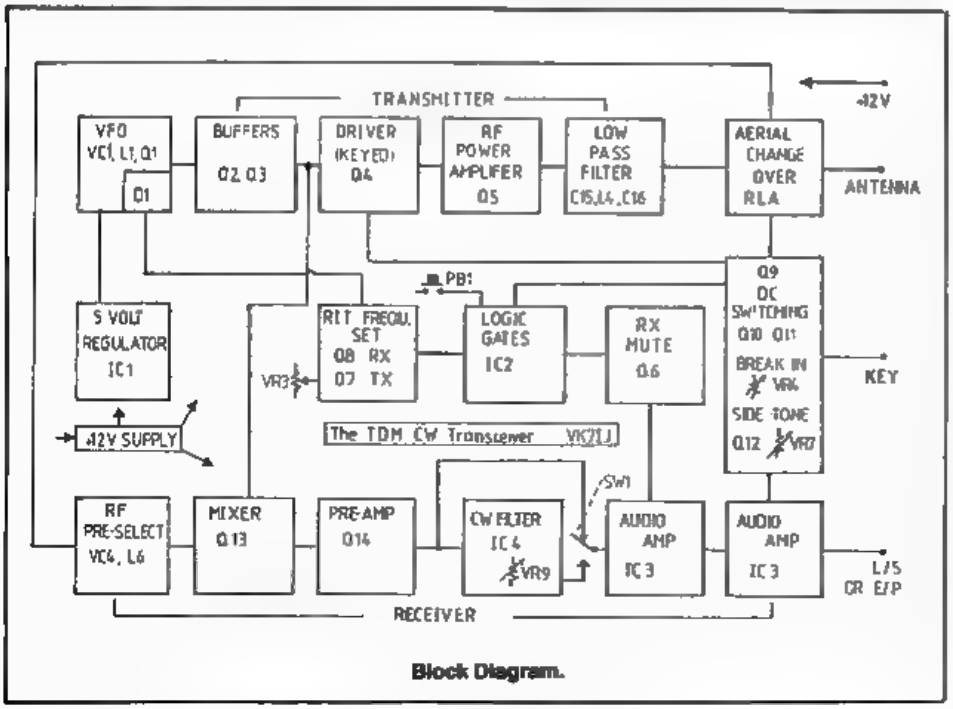


CIRCUIT DISCUSSION

Much of the circuitry is conventional and acknowledgment is given to the fact that this transceiver design is an extension of my original attempt to build the "SCD" described by the G-QRP Club and republished in the CW Operators QRP Club magazine, *Lokey*. Authorship is claimed for the upside-down driver stage, Q4, and the use of CMOS ICs in this application. A printed wiring board layout has also been designed completely from scratch.

CIRCUIT DESCRIPTION

The description relies heavily on the old adage that a picture is worth a thousand words. Therefore, please refer to the block diagram and the circuit diagram. An attempt is made to highlight the main features.



Block Diagram.

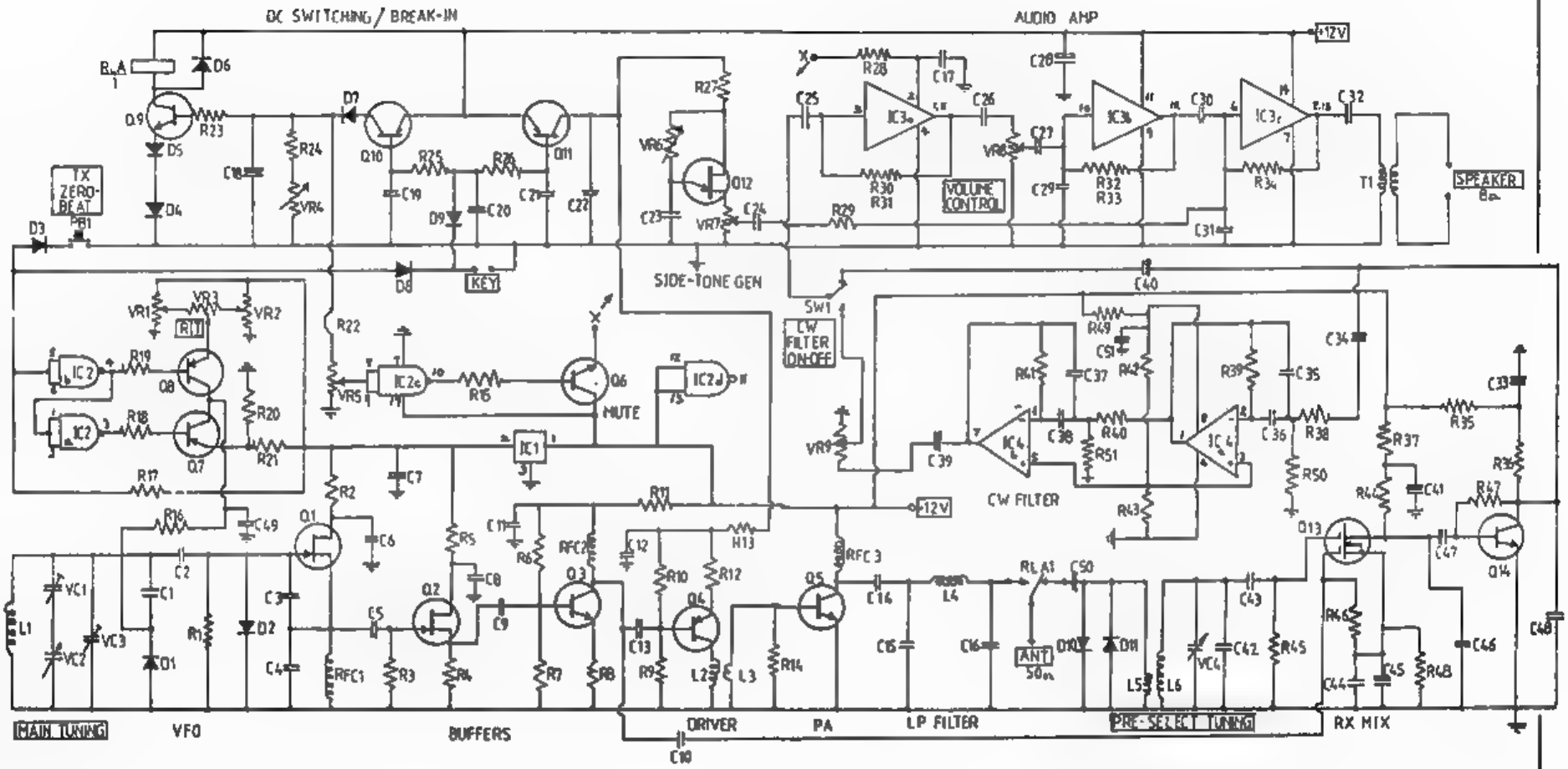
A Colpitts VFO comprising Q1, L1, VC2, C3, C4 forms the heart of the transceiver. Diode D1 acts as a voltage dependent capacitor. Its capacitance is set by a fixed voltage, supplied via Q7, on transmit and a variable voltage from VR3, supplied via Q8 on receive. This variable voltage provides the RIT function.

The VFO output is buffered by Q2 and further amplified by a class A stage Q3. This RF signal is applied to the keyed class A driver stage and to gate 2 of the dual gate MOSFET mixer, Q13, in the receiver.

During receive, the desired signal from the antenna is peaked by varying VC4. The VFO frequency is set slightly below or above that of the incoming signal. Due to the mixing action of Q13, the difference (and sum) frequency, ie the desired audio, appears at the drain of Q13. The RF component is removed by C46. The audio signal is lifted in level by Q14 and IC3.

Although IC3 is considered to be a digital CMOS device, it is biased to linear operation by R30, 31, 32, 33, 34. Output power is low, being only a few hundred milliwatts, however the use of this device has some advantages. Firstly, due to operating conditions, overload inputs tend not to be clipped, but instead are progressively rounded off, thus harsh audio quality is avoided. This produces the impression of high signal power.

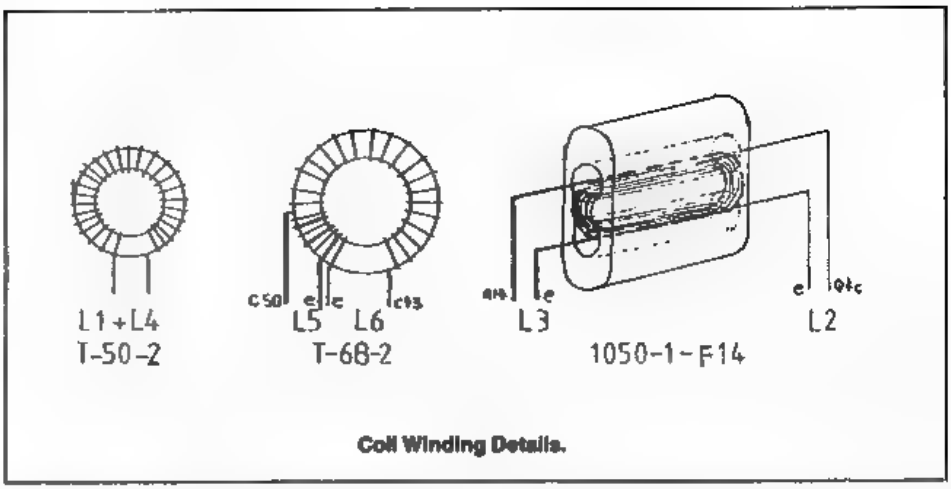
Secondly, because of this "soft" clipping action, the peak output and average output powers are similar and hence the operator is protected from the nasty experience of loud clicks when using headphones, caused by electrical appliances being switched on, or by static crashes. This allows the volume control to be advanced for weak incoming signals without the fear of being zapped. (The author


RIT
AMATEUR RADIO, January 1987 - Page 19
DC SWITCHING / BREAK-IN
AUDIO AMP
+12V
TX ZERO-BEAT
PB1
KEY
SIDE-TONE GEN
SW1
CW FILTER ON-OFF
VOLUME CONTROL
SPEAKER
8Ω
MUTE
CW FILTER
ANT 50Ω
MAIN TUNING
VFO
BUFFERS
DRIVER
PA
LP FILTER
PRE-SELECT TUNING
RX MIX

as had the somewhat shattering experience of listening to headphones powered by devices such as the LM380. These devices are capable of several watts peak!) Another advantage of using the 4007 is the very low current consumption (15 mA).

When receiving CW signals a filter, IC4, can be selected via SW1 to reduce the problems of band noise and adjacent channel interference. The filter has a centre frequency of 800 Hz and a bandwidth of 150 Hz.

When the key is pressed for transmit many things happen. The 12 volts supplied via R17 is grounded and the wired inverter gates IC2a and IC2b change state causing Q7 to conduct and Q8 to switch off. This action sets the transmit frequency. Q10 conducts and applies DC to the base of Q9 causing Q9 to conduct and activate the relay RLA. This action connects the transmitter output to the antenna. C18 charges and prevents RLA releasing, for a time set by VR4, when the key contacts are opened. This prevents the relay from chattering during normal character sending speeds. Q6, which is normally conducting, is switched off by the action of IC2c gate via VR5. This removes the supply voltage from IC3a, thus muting the audio amplifier. Voltage is supplied via Q11 to both Q12, a relaxation oscillator, and Q4. The audio output from Q12 is applied to IC3c via VR7 to provide side tone from the speaker or earphones. Q4 is keyed on, amplifies the RF signal from the VFO/Buffer chain and drives the class C final stage, Q5. The 1.5 watt output from Q5 is fed through the single-pole low pass filter to reduce the harmonic content.



Coil Winding Details.

The driver stage, Q4, evolved from some experimentation.

Firstly it allows keying by means of the 12 volt supply being applied to the emitter. Emitter keying is desirable as it reduces break through leakage of the RF signal via the base-emitter junction during the key-up condition. Secondly, it allows one side of both the windings L2 and L3 to be earthed. This feature appears to improve stability. It is, however, still necessary to find the best polarity of these windings for the best drive to Q5. Finally, even allowing for the lower F of the PNP device, the stage has been found to have very high gain thus reducing the required RF input level and hence the loading on the VFO.

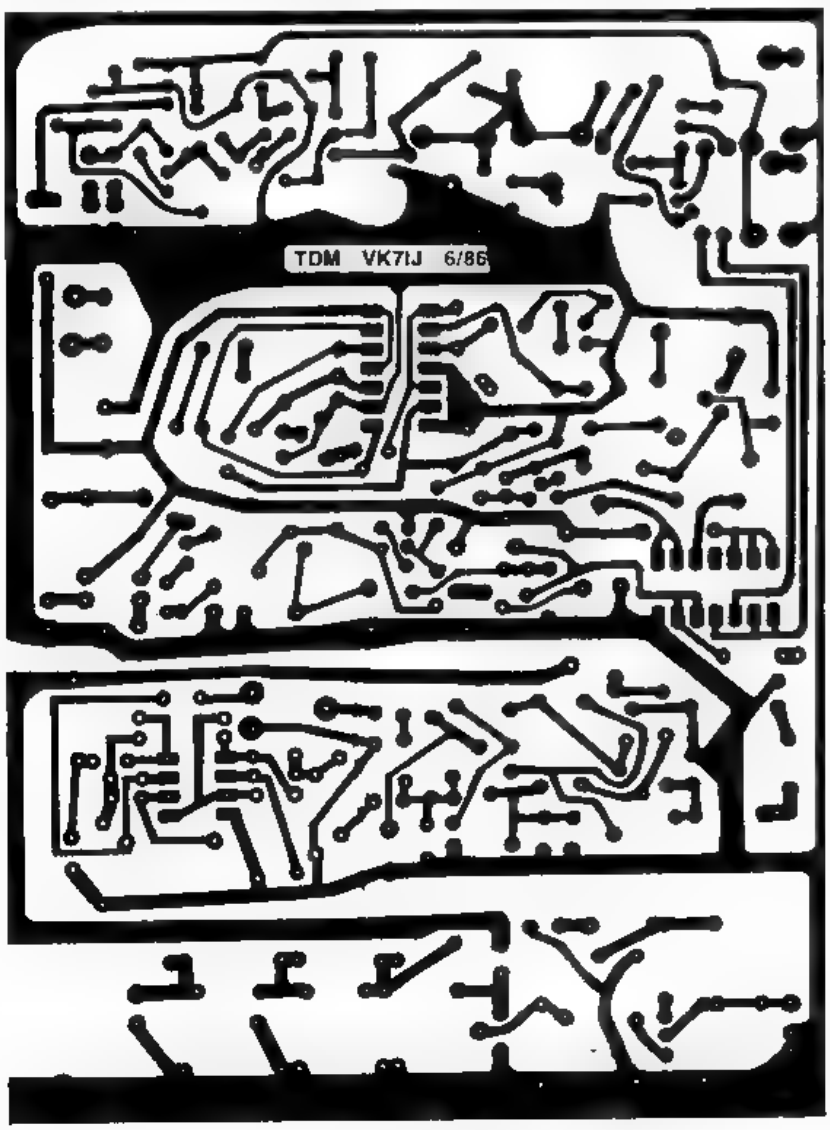
Power supply requirements — well regulated 12-13.5 volts DC at one amp.

CONSTRUCTIONAL NOTES

The usual precautions for handling CMOS IC devices should be observed. Care is also needed regarding the polarity of polarised components and the pin layout of transistors. It is recommended that the VFO be constructed and aligned first. It may be necessary to add a capacitor across VC3 in order to lower the frequency to within the required range. Such trimming will be dependent on the actual value of VC2. Check the five volt supply from IC1. Then, using a frequency counter or the station receiver, adjust VC3, with VC2 fully unmeshed, so the top-of-band frequency is set (3.7 MHz). Then, with VC2 fully meshed, adjust VC1 so the bottom-of-band frequency is set (3.5 MHz). Repeat these steps until both frequencies are correct.

Next construct the receiver, CW filter and audio amplifier. Remember to connect the RF from the VFO to Q13. Nothing will be heard from the speaker until the audio amplifier is unmuted, so temporarily connect 12 volts to R28. Then, with an antenna connected to C50 (during the evening) it should be possible to hear both CW and sideband signals. By switching to CW filter and then altering VC2 it should be possible to place CW signals in the passband of the filter. VR9 is adjusted so that the audio output level is a little higher than with the filter off.

The driver, PA and output filter stages can now be constructed. Temporarily connect a suitable dummy load/power meter to C16 and, having connected the VFO RF output to C13/Q4, momentarily connect the 12 volt supply to R13. Power output should be observed. At this point check the polarity of L3 to ensure maximum output. C13 should be adjusted (reduced) until the power output



Printed Wiring Board Artwork.

begins to reduce — this should be 1 5 to 2 watts. Ensure a heat sink is fitted to Q5 and do not hold Q4 keyed too long (five seconds) or Q5 may be damaged It is a good idea to fit a 5-30 pF trimmer in place of C13 so changes in drive level can be readily made. This adjustment is important because, even though no greater than two watts can be produced, it is possible to overdrive the base-emitter junction of Q5. Once adjusted, Q5 will get only moderately hot after a "key-down" of 15 seconds or so.

Finally, the DC switching stages can be constructed — leave R13 disconnected meantime. Measure the voltage at the collectors of Q7, Q8 while adjusting VR3, some variation should be noted depending on the setting of VR1 and VR2 Now press PB1 and the voltage should be fixed at approximately two volts — similar to that at the junction of R20, R21 With PB1 still pressed tune to a CW station until the signal is zero beat, ie tuning VC2 to either side of the incoming signal the frequency of the audio tone increases. (Make sure the CW filter is off). Release PB1 and adjust VR3 (RIT) to its mid-mechanical position Now adjust VR1 so the voltage on the wiper is about 0.5 volts less than that at the junction of R20/R21 ie 1.5 volts Adjust VR2 until the voltage on its wiper is about 0.5 volts greater that that at the junction of R20/R21, ie 2 5 volts. By careful adjustment of VR1, VR2 it should be possible to again obtain a zero-beat at, or near, the mid-position of VR3 and simultaneously obtain an approximately equal plus and minus changes in audio pitch when VR3 is turned from one end of its travel to the other. This procedure sets the RIT range. About ± 3 kHz is ample but the circuit is capable of ± 10 kHz or more if required Connect a key and close the contacts, the voltage at the collectors of Q8, Q7 should be the same as when PB1 was pressed Also, the relay should operate and side-tone should be audible — set the level by adjusting VR7. The side-tone frequency is set by VR6. Release the key and the relay should release, adjust the release time, using VR4, so the relay remains operated during normal keying.

Connect Q6 emitter to R28 and again key the circuit, muting of the receive signal should be noted. Adjust VR5 until the mute releases at about the same time as RLA when the key is [redacted].

If all is correct, connect the collector of Q11 to R13 and the dummy load/power meter to the antenna socket. Key the transmitter and RF power output should be observed The transceiver is now ready for air testing

OPERATION

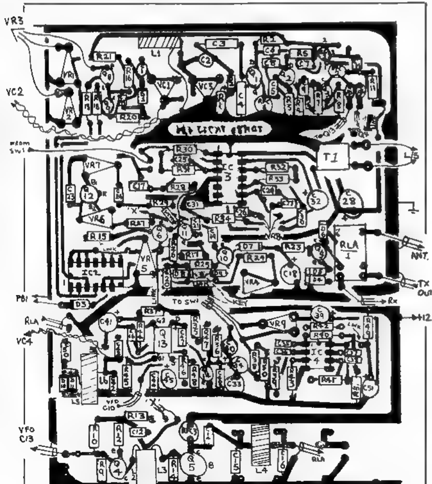
Switch the unit on and allow to stabilise for about 30 minutes. With a 50 ohm antenna connected tune to a desired CW station while pressing PB1 and with the CW filter off Zero-beat the signal and then release PB1 Adjust the RIT to give the desired audio pitch If the CW filter is used, set the RIT to give the passband frequency, about 800 Hz Adjust the RF preselect tuning to peak the response Do not adjust the main tuning as this alters the transmit frequency.

PERFORMANCE

No station equipment is available to measure receiver sensitivity but it lives up to all the claims made in published literature The main testimony to performance is the variety of contacts and reports given The author has had regular contacts into VK3, 2, 1, 5, and 7, some contacts into VK4, 2 and VK6. Reports range from 599 (VK5) to 329 VK6. Several contacts have been had with ZL stations receiving good reports, 4/5 39. These contacts have all been made using a standard dipole located about six metres up. SWLing has also been a pleasure with signals from W/K, JA, P29 being regularly copied, not withstanding QRM, QRN and QSB!

Since the completion of the original circuit, audio triggered RF automatic gain control has been developed and successfully installed. This circuit irons out some of the level differences due to strong local and weak distance stations. It also helps prevent overload in the mixer due to very strong local stations. The circuit will be published in a later article.

I wish to thank my family for their patience and support, Mrs C Fern for typing the manuscript and Mr A Howard for the photography.



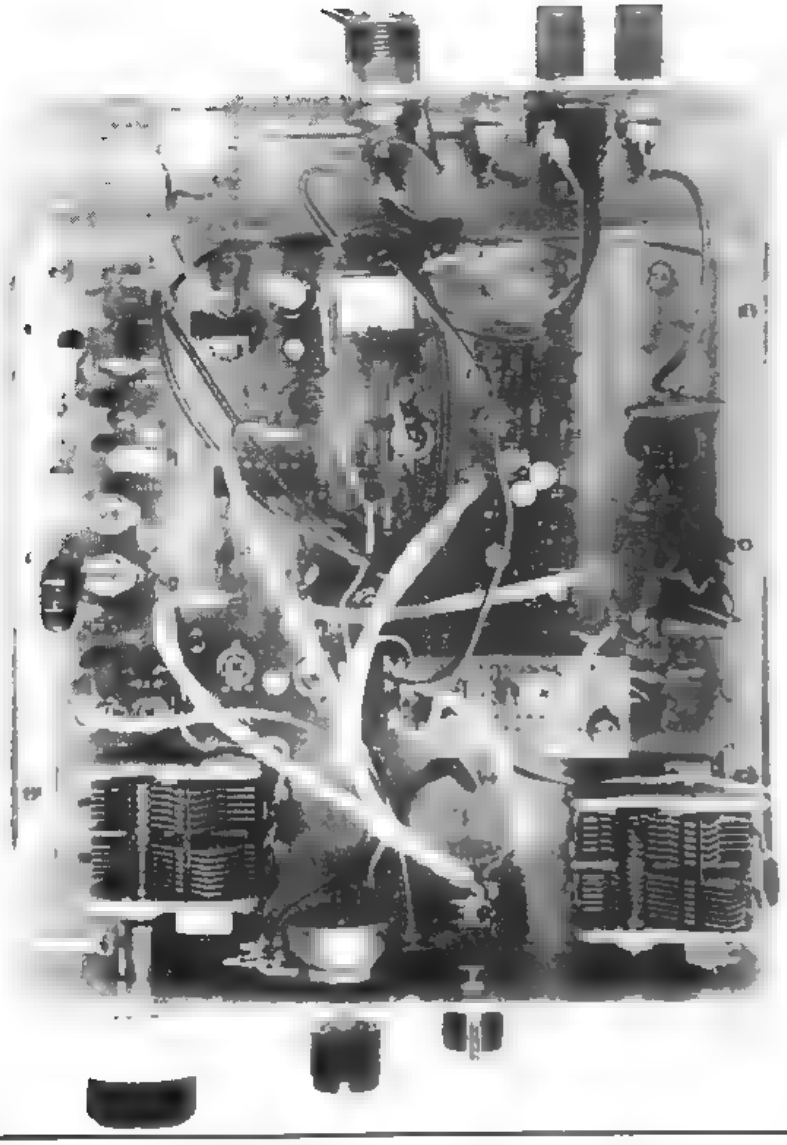
Component Locations and Interconnection.

PLEASE NOTE

It is necessary to use miniature 50 ohm coaxial cable to connect the VFO output to the receiver and transmit sections. This cable also needs to be used to connect the antenna to relay, relay to receive and to transmitter LPF

ar

IC 1 78LO5A	Five volt Regulator for VFO
IC 2 HCF4011 CMOS	Switching
IC 3 HEF4007 CMOS	Audio Amplifier
IC 4 LF353N — TL072 etc	CW Filter
Q 1 MPF102 JFET	VFO Oscillator
Q 2 MPF102 JFET	Buffer
Q 3 BC548 NPN	Preamplifier
Q 4 2N3905 PNP	Transmit Driver
Q 5 2N3019 - 2N3054 NPN Power	Transmit Preamplifier
Q 6 BC548 NPN	Audio Amplifier Mute
Q 7 2N3905 PNP	Transmit Frequency set key down
Q 8 2N3905 PNP	Receive Frequency set key up
Q 9 BC548 NPN	Relay Driver
Q10 2N3905 PNP	DC Switch/timing
Q11 2N3905 PNP	DC Switch
Q12 2N2646 UJT	Side-tone generator
Q13 MPF121 — 131 Dual gate M-FET	Receiver Mixer
Q14 BC548 NPN	Receive Audio Preamplifier
RFC 1 1 5 mH	
RFC 2 1 5 mH	
RFC 3 3t 22 SWG Philips six hole ferrite bead	
L 1 34t 28 SWG T · 50 — 2	VFO tuned CCT
L 2 8t 28 SWG	Balun Former 1050/1/F14
L 3 2t 22 SWG	Balun Former 1050/1/F14
L 4 21t 22 SWG T — 50 — 2	LPf
L 5 4t 22 SWG at ground end of L6	T 68 2
L 6 34t 22 SWG	T — 68 — 2



SW1 SPDT miniature — CW Filter on/off
T1 1000 — 8 ohm miniature
PB1 SPST momentarily-action push to make
D1 IN4001
D2-11 IN914 etc
RLA Miniature PCB mount 320 ohm SPST — DS cat S7112

VC1 10-140 pF trimmer — Low frequency set
VC2 0-150 pF tuning gang
VC3 10-140 pF trimmer — High frequency set
VC4 0-150 pF tuning gang

VR1 20k linear horizontal preset — RIT limit set
VR2 20k linear horizontal preset — RIT limit set
VR3 20k linear pot — RIT
VR4 10k linear horizontal preset — Break in delay set
VR5 20k linear horizontal preset — Mute release set
VR6 20k linear horizontal preset — Side-tone frequency
VR7 5k linear horizontal preset — Side-tone level
VR8 500k log pot — Audio output
VR9 20k linear horizontal preset — CW filter level

RESISTORS — quarter watt resistors, five percent (Metal-oxide preferred)

R 1	100 k	R18	68 k	R35	220
R 2	100	R19	68 k	R36	4.7 k
R 3	100 k	R20	47 k	R37	220
R 4	1 k	R21	68 k	R38	22 k
R 5	470	R22	LINK	R39	100 k
R 6	27 k	R23	10 k	R40	22 k
R 7	3 k	R24	1 k	R41	100 k
R 8	100	R25	10 k	R42	10 k
R 9	6.8 k	R26	10 k	R43	10 k
R10	1 k	R27	3.3 k	R44	4.7 k
R11	100	R28	4.7 k	R45	100 k
R12	100	R29	100 k	R46	33 k
R13	47	R30	10 M	R47	1 M
R14	100	R31	10 M	R48	1 k
R15	47 k	R32	10 M	R49	1 k
R16	220 k	R33	10 M	R50	1 k
R17	220 k	R34	10 M	R51	1 k

CAPACITORS

C 1 68p (s) styro	28 470u (e)
C 2 150 p (s)	29 220p (c)
C 3 680p (s)	30 0.0022u (g)
C 4 680p (s)	31 220p (c)
C 5 47p (c) ceramic	32 10u (e)
C 6 0.1u (c) monolithic (m)	33 100u (e)
C 7 0.1u (c) (m)	34 0.22u (g)
C 8 0.1u (c) (m)	35 0.022 (g)
C 9 68p (c)	36 0.022 (g)
C10 30p (c)	37 0.022 (g)
C11 0.1u (c) (m)	38 0.022 (g)
C12 0.1u (c) (m)	39 1u (e)
C13 30p (c) or 5-30p trimmer	40 0.22 (e)
C14 0.1u (c) (m)	41 100u (e)
C15 750p (s) or (c)	42 150p (c)
C16 750p (s) or (c)	43 150p (c)
C17 0.1uF (c) (m)	44 0.02 (c)
C18 47u electrolytic (e)	45 25u (e)
C19 0.1 (c) (m)	46 0.047 (c) (m)
C20 0.1 (c) (m)	47 0.47 (s)
C21 0.1 (c) (m)	48 0.022 (g)
C22 0.1 (c) (m)	49 100p (c)
C23 0.1 (c) (m)	50 100p (c)
C24 0.0022u green cap (g)	51 22u (e)
C25 0.0047u (g)	
C26 0.0047u (g)	
C27 0.0022u (g)	

Try This!

BARGRAPH SWR INDICATOR

Ivan Huser VK5QV
7 Bond Street, Mount Gambier, SA 5290

A little SWR indicator which may be used as a separate unit built into a small commercial utility box or as an integral part of a larger project such as a linear amplifier or antenna tuning unit.

A SWR meter connected in the feedline at the transmitter is a very useful device if correctly interpreted. Depending on the match or more precisely the mismatch of the system, the SWR may appear to be very high, very low or somewhere in between depending on the actual match.

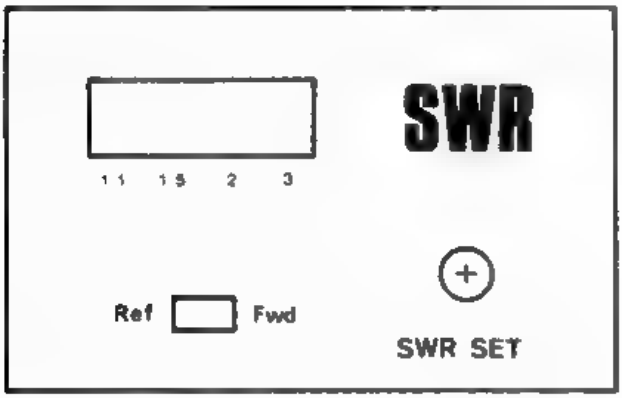
The apparent SWR measured at this point may be quite meaningless. However, any sudden or gradual change in the reading will indicate a possible change in the antenna or feedline parameters and hence trouble. This is where this little bargraph indicator can be useful.

CIRCUIT

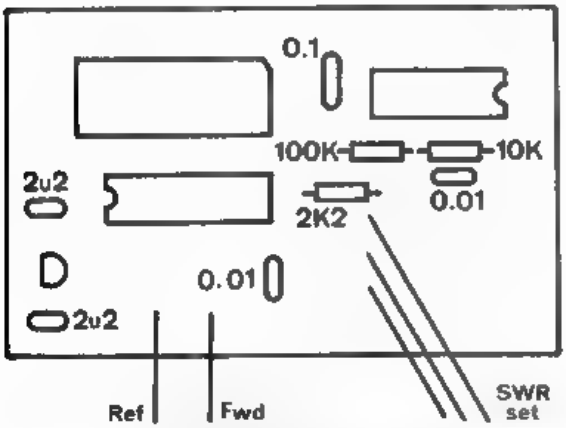
The RF sensing head is similar to that found in many publications such as the *ARRL Handbook*, where adjustment procedure is also generally given.

The respective output from the RF section is amplified by an operational amplifier ahead of the LM3914 bargraph driver.

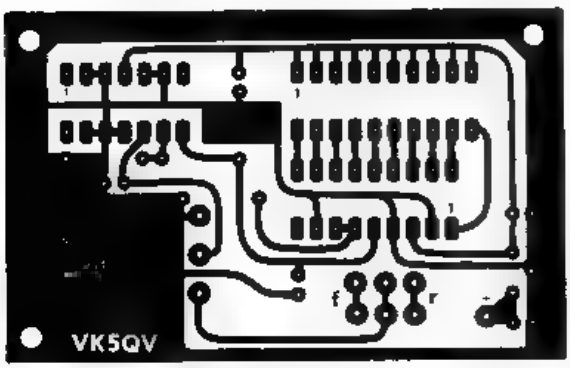
When correctly calibrated, the last LED represents a SWR of 3:1. Due to the particular characteristic response of the LM3914, the other segments of the bargraph do not relate directly too easily, to interpret SWR values. However, the first segment is very close to a SWR of 1:1, the fourth segment close to 1.5:1 and the seventh segment close to 2:1. This is quite satisfactory in all but the most critical applications.



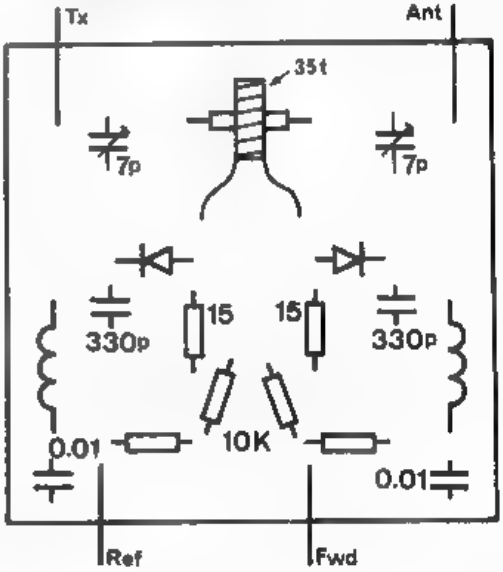
Front Panel (Full Size).



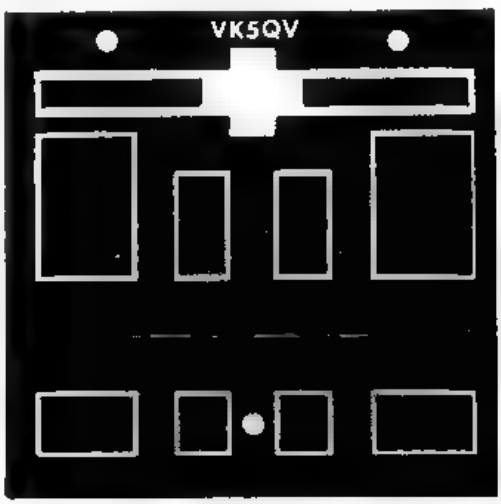
Component Overlay.



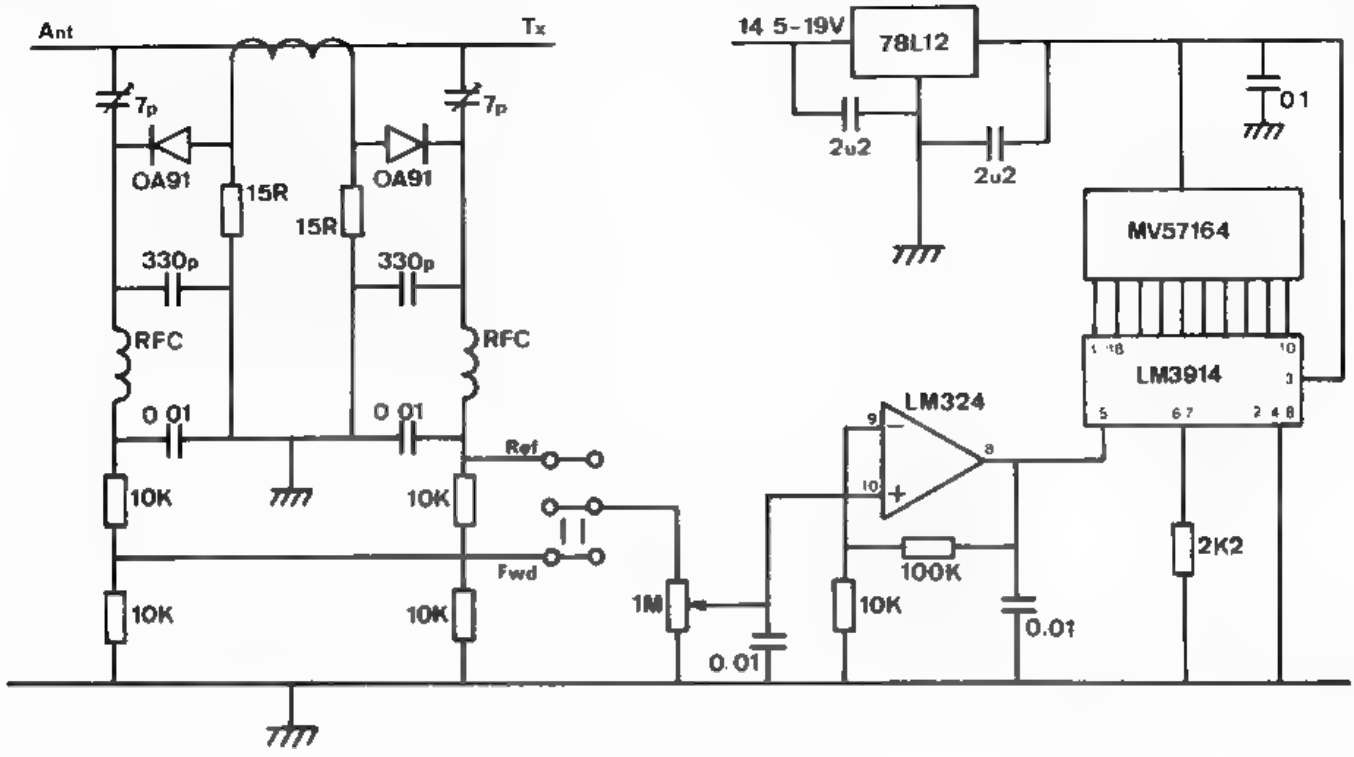
PCB Pattern (Full Size).



RF Board Layout.



RF Board (Full Size).



Bargraph SWR Indicator.

Because of this, the bargraph SWR indicator will be found to be most useful where a knowledge of the relative SWR is required rather than an absolute value.

CONSTRUCTION

All the information necessary for constructing the unit is given in the diagrams.

Ideally, the RF section should be built separately and well shielded from the indicator section. However, with care there is no reason why the RF section and indicator cannot be built into the same box.

It is standard practice of course to use a red filter with the bargraph.

References:

Linear Data Book — National Semiconductors.
In-Line RF Wattmeter — *ARRL Antenna Book*.

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QSP

GEOSYNCHRONOUS STUDY PLAN

The dream of an easily accessible amateur satellite communications system apparently has taken a giant step forward. In a concept for the next generation of satellites, AMSAT sees intercontinental QSOs via hand-held transceivers, high-speed packet trunks and even digital ATV by the decade's end.

AMSAT Engineering Vice-President, Jan King W3GEY, has just completed a "Phase 4 Technical Study Plan" by which AMSAT hopes to determine the viability for a pair of geosynchronous AMSAT satellites.

According to Jan, the main thrust of Phase 4 should be public service. Only in this way, he says, can the program work. Phase 4 needs support of a much broader coalition of amateurs than has ever previously thought of itself as satellite communicators. And, significantly, amateurs need to promptly justify their use of (especially) the UHF spectrum, as a resource of incalculable worth!

To garner support, the Phase 4 Study Plan proposes a multi-transponder package using the two-metre, 70 cm, 24 cm and 13 cm bands. Features would include linking selected repeater teleports through the satellite for dial-up inter-city or intercontinental communications between stationary or mobile platforms — even hand-held transceivers; a dedicated high-speed packet transponder for linking terrestrial regional networks into a semi-global network; a linear transponder for SSB and CW; a special facility for ATV using digitised video and, for the UHF experimenters, a microwave beacon experiment. "Receive-Only" teleports or gateway repeaters by the thousands could be linked to receive bulletins upon receipt of a special alert code transmitted via satellite.

The network thus established would comprise one of the most robust networks anywhere and would be available to support emergency operations. Simple one-metre dishes aimed at the satellite with inexpensive integrated LNA/mixers at the feed would suffice to capture the 13 cm downlink.

While the traditional linear transponder-type access will continue in the form of a Mode JL transponder, the emphasis of Phase 4 clearly will be on ease of access, convenience, predictability and reliability and availability. The traditional tracking and predicting access will be gone as one will merely point one's antennas at a given spot in the sky . . and "weld" them in place!

ATVers, microwave experimenters, repeater organisations and repeater consortia interested in a risk-sharing partnership with AMSAT are sought. Whilst Phase 4 is a long-term program, early indicators of interest and helpful suggestions are most welcome. Write to AMSAT, Phase 4 Program Manager, PO Box 27, Washington, DC, 20044.

—Abridged from *The ARRL Letter* September 29, 1986.

ADVICE

Anyone in need of circuit details, alignment notes, or technical advice in regard to the STC MTR 151 VHF mobile transceivers, recently released by the WIA Victorian Division, may contact VK3QQ, QTHR.

May I remind all amateurs that these VHF transceivers require no modifications to get them on to the two-metre amateur band. Alignment is quite straight forward and a good unit will produce at least 25 watts with a receiver sensitivity of 0.3 uV for 12 dB SINAD.

VIDEO REVOLUTION

O Japanese companies involved in the home video market are set to bring out a range of new equipment, according to reports from the 25th Japan Electronics Show, in Tokyo.

Sony has launched a new compact video camera using the eight millimetre standard, and JVC has unveiled the world's smallest and lightest video camera using the half-inch VHS format. The Sony unit weighs 1.7 kg with batteries and cassette, but also features a self-focus lens and can play two-hour cassettes.

The JVC model is lighter, more compact and cheaper but only has a one-hour cassette.

—Contributed by Jim Linton VK3PC

THE GLICHER PADDLE

Gil Griffith VK3CGG
7 Church Street, Bright, Vic. 3741

If you know anything about CW you will probably have heard of the Bencher Paddle which is said to be the "Rolls Royce" of paddles.

No one would dream of building a modern HF transceiver at home these days, me included, but a good paddle can be just as useful, and when I first saw the *Bencher Paddle* I naturally wanted to own one but it was well out of my price bracket! And, as my junk-box runs to steel sections, nuts and bolts, rather than transistors and resistors, etc, I thought I could home-brew a facsimile. ***So could you!***

It is amazing just how many amateurs have built the EA-78 keyer, which was sold in kit form, so if you can locate one of these, all you need is a good paddle and you are in business. A paddle is really only a double-pole switch so, do not forget that you will need the electronic keyer (or the one from your rig if it has one), to go with the paddle.

If you have read thus far and you have no interest in CW, it would be worth noting that, if you learn to use a paddle and keyer, you will find that your fingers will send good CW of their own accord, you will not have to think about it and you will not get tired. Let's face it, you don't have to think about how to work your voice, do you? Well, your fingers will simply be an extension of your voice. It is a whole new language!

Back to the task . .

An hour or so rummaging in various places located the basic ingredients:

1 a solid steel plate for the base, approximately 120 x 75 x 12 mm, but it can be any convenient size provided it is heavy
2 one piece of brass-bearing stock approximately 40 mm OD and 25 mm ID, however, any piece of pipe would suffice as this is for the frames
3 two teaspoons with attractive engraved handles, for the handles of the keyer
4 four assorted gold nuggets from the Ovens River (not easy to locate but they provided an interesting summer — fossicking). Why settle for silver contacts?
5 scraps of Perspex, courtesy of the local chemist
6 about 75 mm of 12 mm copper bar, but could be almost anything for the fixed contact mounts
7 four small silver plated brass pins approximately 1.8 mm diameter by 10 mm long. These are for the hinge points, but slightly heavier ones would be better
8 16 assorted 3 and 4 mm metric screws and nuts
9 one spring, tension, about 70 mm long with weight to your requirements
10 rubber feet, wire and a 6.5 mm stereo plug.

TOOLS REQUIRED

You will need a drill, taps — 3 and 4 mm metric to suit the screws, a hacksaw, emery paper, brass polish, hammer, screwdriver, and a grinder is possible.

It is possible to make the frames by hand but I thought the lathe needed oiling so I used it to turn the three identical frames — one spare, one to cut in half for the hinges, and one as a main frame.

My lathe is large and has a 16 inch (400 mm) swing and 60 inch (1.5m) bed, with a 12 inch (300 mm) four jaw chuck, so it is not ideal for this type of work!

METHOD

The main frame — a flat was ground on one side (which became the bottom) and two holes were drilled and tapped to take 4 mm screws. I used 10 mm spacing which turned out to be a mistake so 15 mm spacing would be better. Two holes were drilled in the base to mount the frame slightly forward of centre. Here 10 mm spacing was used on the four hinge pins (this was the mistake as they interfered with the mounting screws) the four holes must be drilled to the same depth so that the pins all protrude about 6 mm above the front face of the frame. Two more holes were tapped into the sides of the frames to take the stop-adjusting screws.

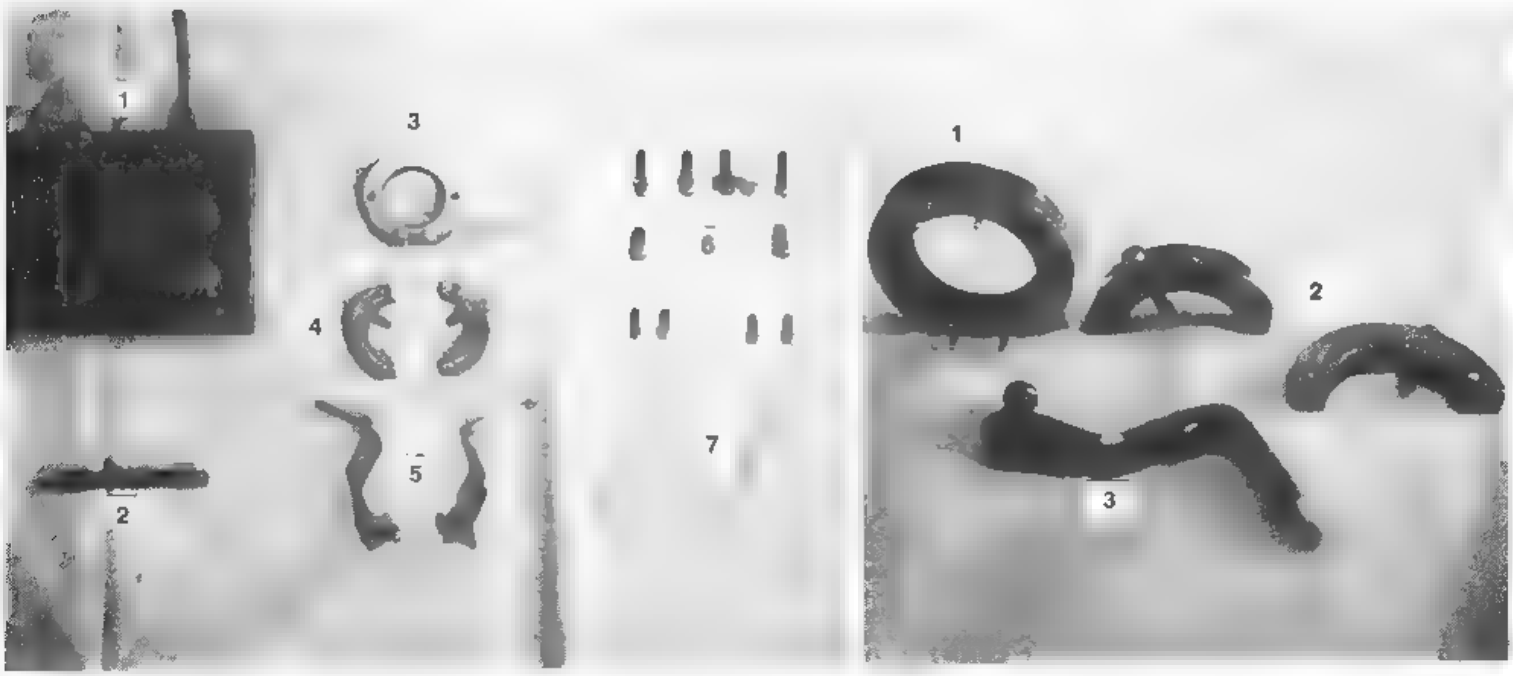
The hinges — the second frame was cut in half and ground so that there was a gap of 3 mm when they were laid on top of the frame, a little filing was also required at the bottom so that they don't touch the base. (Remember, you ground the frame off to mount it!). Four holes were drilled, all to the same depth, to mate with the hinge pins, using a 3 mm bit.

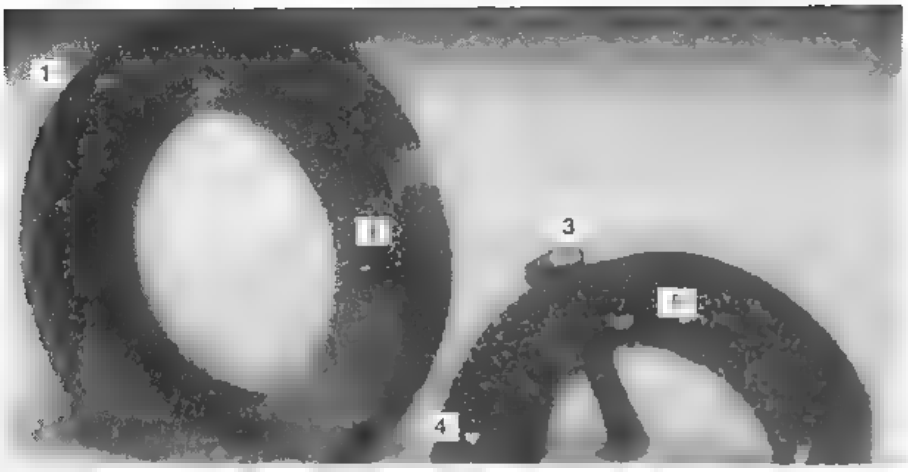
Lever mounting holes of 4 mm were drilled and tapped in the sides to mate with the stop adjusting holes in the frame. Two 3 mm holes are then drilled and tapped slightly above these, pointing to the centre (inwards and downwards) to accommodate the screws which hold the spring.

The levers — these are subject to a fair amount of abuse during operation so I used teaspoon handles made of stainless steel which were fairly difficult to bend. The shape that is needed depends on the placement of the frame, hinges and the fixed contact mounts so the bending was done bit-by bit in a vice. Two holes were drilled on the narrow ends of each to take the Perspex handles, one in the centre to mount it and one on the wider-end to take a

Basic ingredients.
1. Base; 2. Spring; 3. Frame; 4. Hinges; 5. Levers; 6. Screws; 7. Handles.

1. Main Frame. 2. Hinges. 3. Lever.





1. Hinge Pins; 2. Stop Screw Hole. 3. Lever Mounting Screw Hole. 4. Hinge Pin Hole. 5. Spring Mount Screw.

contact screw, although a screw is not really necessary.

The base — having already drilled the holes to mount the frame, two large holes of about 12 mm were drilled for the fixed contact mounts and one in the centre at the back to take the spring mount, which I tapped for 7/16 Whitworth and used a bolt with the head cut off for the mount. I turned the bolt in a drill and filed it to shape to take the spring then polished it with emery and brass polish whilst still in the drill.

The fixed contact mounts were turned down to about 10 mm at one end and pressed into plastic sleeves to insulate them from the base. These were then pressed into the base with such force that no glue was required. They are also drilled and tapped to take the contact adjusting screws, which have to be at the right angle and height to meet with the moving contacts on the levers. They were tapped at the bottom to take screws for connecting the wires to the iambic keyer.

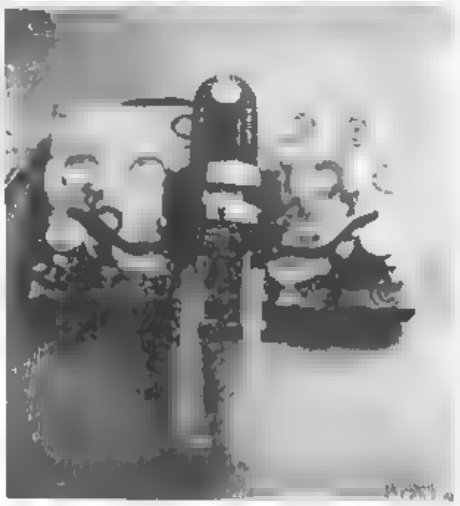
The handles — simply cut out and sand the two together to your desired shape. Two holes were drilled in each to mount them to the levers.

The contacts — I drilled a 1/16th inch (1.5 mm) hole in the end of each screw and very carefully hammered a small gold nugget into the hole, shaping it with the hammer and then polishing it with brass polish.

At this stage I assembled the whole thing to see if it would work and to adjust the spacings, etc. The really hard part was yet to come with the polishing!

I used fine emery on the frames to take out the tooling marks then, with a couple of layers of cloth on the bench, soaked in brass polish, then lots of rubbing to get a mirror shine. Round items such as screws were mounted in a drill chuck and polished.

The base-plate was ground to a smooth finish on the edge of a cut-off wheel then jewel



polished with a wire brush in the drill. An hour extra polishing would have improved the looks here.

For a couple of finishing touches I made a box out of Perspex to keep off the dust and a name plate using a piece of 25 x 6 mm aluminium flat, which I had engraved and polished with brass polish so that it looks like silver. All the scratches can be removed from Perspex by using brass polish too.

The total time was about 18 hours but the cost was only $2.50 for the engraving, so I think it was a worthwhile project especially as it works as well as a *Bencher*, with even more adjustments to suit any individual taste.

I mounted the base on four rubber feet and as it is heavier than a *Bencher* (which has only three feet), it does not hop around on the bench when I get excited.

I am more than pleased with the results and if you "have a go," you will be too. Then call me on air and let me have a listen!

—

QSP

JA PACKET REPORT

Following is an extract of a report by Kenji Rikitake JJ1BDX from *Gateway* the *ARRL Packet-Radio Newsletter*, September 5, 1986.

From August 22 to 24, a "Ham-Fair" was held in Tokyo where many companies and radio clubs demonstrated packet radio with PCs. Packet Radio User's Group (PRUG) of whom Kenji is the Public Relations Officer, was represented.

PRUG demonstrated an original electronic-mailing system written in Modula-2 language by JN1OLJ. Also, a simple written-in-BASIC bulletin-board system was demonstrated. The program, written for an IBM PC by Joe Speroni 7J1AAA/AH0A and modified for PC-9801 by Kenji, has a 'language-selection' system and the user can choose the character-code-set for system messages (some Japanese amateurs can read Kana (Japanese phonetic scripts) and Kanji (Chinese ideograms).

QSP

SCHOOL DATA NETWORK ON HF RADIO

Some years ago the Education Department of Victoria initiated a scheme to install an HF SSB radio system to cover some 44 of their schools located in various rural and remote areas of the State.

The scheme was instigated to ensure that remotely located students would not be disadvantaged through the lack of personal contact with their tutors which can inevitably occur when subjects are conducted purely by correspondence.

Following the successful introduction of this radio network, the Correspondence School decided a further improvement in student services could be gained by introducing computer networking to these same remote schools.

The network would be used both for tuition in the computer subjects as well as a medium via which students could speedily return their work for correction to the Correspondence School in Melbourne. Apple 11C and Apple 11E computers were used throughout.

Although highly successful, the computer network made use of the Telecom public telephone system as its communication medium. All calls to schools in the network were STD and sometimes lasted for long durations. Inevitably overall operating costs became prohibitively high.

An alternative to using the high cost telephone system was to study the possibility of using their existing high frequency radio network as the data communication medium. However, it was obvious that signal fading, high noise levels and distortion may cause unacceptably high error rates in the data to be transferred.

A solution to this problem was an intelligent radio data modem manufactured by GFS Electronics in Mitcham, Victoria.

The CPU-100 radio modem operates as a master slave system using a specially developed block exchange compelled sequence protocol (BECSP) to provide error detection and correction.

Trials with the radio modems commenced in late 1985 between the Correspondence School's Mount Waverley radio centre and a number of north- western Victorian schools. The unit was able to handle a range of varying radio conditions and still provide error free data communication.

The radio data system, using Codan transceivers and Apple computers, has introduced a previously unavailable facility to the network, with negligible operating costs compared to networking through Telecom's dial-up network.

—*From Electronics News*, August 1986

CLAMP-ON CHOKE FOR RFI SUPPRESSION

Novatech Controls has announced a new component from EMC Datacare, the D910 Series clip-on radio frequency choke, for RFI suppression. An introductory D918 kit of eight choke cores and associated hardware is available complete with application notes that will help the user to install them successfully.

Most RFI problems arise from cables acting as aerials. Usually unwanted signals are common mode, that is they can be visualised as travelling along the outside of the cable and can be reduced without affecting the normal function of the circuit.

D910 series common-mode chokes can be installed on cables of up to 10 mm diameter without the removal of any connectors, it is not essential to have any access to the ends of the cable.

For large or rigid cables several pairs of cores are required. For smaller flexible cables multi-turn chokes may be fashioned from the same components to provide substantial impedance to interference currents at a modest price.

—*From Electronics News*, August 1986

SMIS: Improving Productivity and Service

WHAT IS SMIS?

SMIS is the acronym for the Spectrum Management and Information System being introduced by the Department of Communications (DOC).

Effective spectrum management depends on reliable and up-to-date information on who is using the radio frequency spectrum and under what conditions; ie actual frequency, power level, method of modulation, characteristic of the antenna (aerial) etc. SMIS provides a central database storing this information with direct and immediate on-line access to every DOC office.

WHY WAS SMIS CREATED?

Usage of the radio frequency spectrum for communications is growing rapidly — it is doubling every six or seven years. The handling of information on use of the spectrum by using manual and various batch-mode ADP systems is becoming increasingly difficult and labour intensive. SMIS is a means of improving labour productivity while simultaneously improving the standard of service provided to spectrum users.

WHAT WILL SMIS DO?

SMIS is being implemented in stages. The first stage, which is now being introduced, creates a single unified and centralised database to replace a variety of manual record-keeping systems and small computer system databases. Each of these has to be separately maintained — often with duplicated data in each system. Simultaneously, on-line computer access via SMIS enables staff to extract information for their immediate day-to-day work. Stage one activities have concentrated principally on the clerical functions of licensing radio communications systems and handling the money aspects of departmental operations. At the same time, limited access is provided to technical staff to provide information to assist with interference and other necessary investigations. The immediacy of this access, even in the limited form provided in Stage one, will improve the productivity of these aspects of departmental operations.

The logistics of the operation in Australia are that there are approaching 600 000 licenses on issue to private users — this excludes government users like Defence, Aviation, Telecom, OTC, etc. The total revenue generated from licence fees and other spectrum use charges is some $30 million annually.

A useful side benefit of SMIS is the elimination of paper records, which will lead to operating economies in departmental file registries. SMIS is, in fact, a small start in the direction of a paperless office.

WHAT DOES SMIS COMPRISE?

The SMIS installation includes a central computer in Canberra connected to 91 terminals located in Canberra, and the six State and 20 Divisional Offices of the Department. The communications network providing the interconnection between the terminals and the central computer is leased from Telecom.

In each State Office of DOC there are three printers located in the administrative, licensing and frequency assigning areas. The licensing printer is loaded with pre-printed licensing stationery and is used solely for reproducing licenses.

In each District Office there are two printers, one being dedicated normally to the issue of licenses.

HOW DOES SMIS WORK?

The heart of SMIS is in the central computer and the unified database in Canberra. The terminals

DEPARTMENT OF COMMUNICATIONS

are functionally simple devices which interrogate and receive information from the central installation in Canberra, but do not participate in the processing of the information. The communication network is therefore vital to the operation.

By use of the terminal an operator can:

- prepare a bank list for presentation to the bank when making deposits
- maintain other essential finance records
- print-out licenses for despatch to customers or as a duplicate for administrative purposes
- alter licence records when requested (change of address, etc)
- authorise the annual renewal of licenses — the printing and despatch of renewed licenses is centralised in Canberra
- make inquiries concerning the status or details of any licence

SMIS is a computer-assisted rather than an automated system and its functioning is entirely under the control of the operator. It does, however, provide a very substantial degree of operator assistance. Typical examples are:

- call signs for radio communications transmitters or stations can be allocated automatically from a central list unless overridden by the operator
- a customer search facility is provided to enable incoming requests to be identified as belonging to an existing customer — this simplifies processing and minimises redundant records and transactions
- the operator can request calculation of licence fees for specified periods (the standard fee is for one year) or alternately request a common expiry date for new and existing licenses — these calculations enable overall processing of licence applications to be streamlined, minimising paperwork and actions involved in dealing with customers with multiple licenses.

SMIS operates on a table-driven principle. Stored in the central database are sets of tables detailing standardised information associated with various classes of licence. When the operator requests the issue of a particular licence, the computer processor automatically derives all the standard information that necessarily must appear on that type of licence. The operator then adds the specific information (licence name, address, frequency (if required) and any conditions that might apply to the particular licence) from a standard list held in another table in the central computer. The computer assembles all this information and prints out a licence.

The computer does not hold the information on a licence in this form. Each time the licence is viewed or reprinted the computer must look at the licence record and reassemble the information from the various tables and files. This is done to reduce the data storage capacity required in the on- line system.

SMIS is not just a licensing system. It also provides facilities to improve financial and management control functions.

Particular features in this area are:

- an inbuilt control that prevents the issue or re- issue of a licence unless sufficient money has been registered for the transaction
- licence issue is also prevented unless the processing officer has the appropriate delegation to issue the particular class of licence
- various reports are derived from the operating system for statistical, management and audit purposes.

WHO PAYS FOR SMIS?

The $2 million investment and $300 000 annual charges will be paid for by improvements in productivity arising from the introduction of SMIS. Establishment costs will be recovered in four years.

It may not be generally realised that Radio Frequency Management is a self- financing operation with the costs of administration being recovered from licence fees — there is, in fact, a surplus which becomes a royalty on the use of the spectrum which is paid to the Government.

Ultimately the introduction of SMIS will benefit the licensees in terms of lower licence fees than would otherwise be imposed if less productive and efficient manual methods were to be retained.

WHAT CAN SMIS DO IN THE FUTURE?

The availability of on-line access to a centralised database will open the door to further productivity improvements and to achievement of goals not currently possible.

The DOC already has firm plans (designated SMIS Stage two) to:

- improve the quality and speed of response in the technical aspects of determining interference-free frequencies for radio communications services — currently this is a major source of delay in responding to applications for licenses, SMIS Stage one will assist in reducing delays while SMIS Stage two will enable a 24-hour turn-around to be achieved in many cases
- introduce a system of label registration for mobile radio communications transmitters — this is necessary to bring unlicensed operation of mobiles under better control. In some services estimates indicate that 50 percent or more of operating units are unlicensed. This places an unfair financial burden on licensed users. Unlicensed operation also leads to a lack of discipline in radio communications operations which prejudices efficient use of the spectrum and interferes with the legitimate communications of licensed users
- make extensive use of the data communication network for internal communications within the DOC, this will reduce existing telephone and telex costs
- further development of the SMIS system to improve the efficiency of money handling and file-handling activities

Other projects listed for future development are:

- provision of direct access to the database by field officers investigating interference complaints or conducting other necessary investigations
- direct inter-communication between the SMIS database and ADP systems of major users of the spectrum; eg Telecom. This will lead to further substantial operating economies.

Pirie radio club congratulates city

The Recorder, Friday, September 5, 1986

About 20 members and guests of the Mid North Amateur Radio Club and Port Pirie's Deputy Mayor Mr C Robertson formed part of a link-up with the rest of the State to congratulate the Mar Council on arts centenary on Tu

Club secretary, Phillis, said the joined Port Lincoln, Whyalla, Port Augusta, Naracoorte, Mount Gambier and Murray Bridge clubs in forming the network which was used to transmit messages of congratulations to Marion from the various councils mayors and deputy mayors

The Port Pirie club made its broadcast from its regular meeting rooms at the Port Pirie aerodrome late on Tuesday afternoon.

The idea came from the South Australian branch of the Wireless Institute of Australia which decided to operate a special event station with the theme "Service to the community by amateur radio" to mark the council's centenary

Marion council is celebrating "A century of service" as a Jubilee 150 event.

The District Council of Marion was proclaimed on September 2, 1886. It has grown to a population of over 70,500 covering the south-western Adelaide suburban area and has experienced extensive industrial development on the southern boundary

As part of the South Australian Jubilee 150 Marion is sharing exchanges of historical material and personal visits with its J150 twin town, El Paso in Texas.

The Jubilee radio station VI5JSA was used to receive the messages of congratulations from Port Pirie and the other

Victor's Mayor goes on the air...

Victor Harbour Times, Friday September 5, 1986

Mayor Mr Eric [illegible] radio station will be from the Marion [illegible] from August 26 to [illegible]er 5 and on

The Murray Pioneer, Tuesday, September 2, 1986

Radio amateurs

Renmark will be involved in an event conducted by the SA Radio Amateurs on September 2 to celebrate the centenary of the District Council

The radio transmitted greeting will be received in Renmark in the studios of 5RI.

The special radio station has been called the Wireless Institute of Australia (SA Division) Jubilee 150 Station VI5WSA

Mayor greets Jubilee

State radio groups join in

Port Lincoln Times, Tuesday, September 9, 1986

Port Lincoln's Mayor Tom Secker, gives a greeting on the State radio round-up conducted by amateur radio groups as part of Marion City Council centenary celebrations. Lower Eyre Peninsula Radio Club operator Jack Kleinrahm tuned Mr Secker into the link-up and president Carol McKenzie presented him with a special memento certificate. The Jubilee 150 event

Amateur radio station to run August 25 until September 5

Special 'call sign' for council

MARION Council will operate a special event amateur radio station (call sign VK5JSA) from Tuesday to Friday, August 25 to September 5, as part of its centenary celebrations.

The council will be 100 on Tuesday, September 2, and the radio station is just one of many special events planned to mark the event

A display of old communications equipment, literature, documents and QSLs (ham radio call cards) will be set up in Marion Library, Duncan Avenue, Park Holme and Sturt Road Library corner of Morphett and Sturt roads, Marion.

The station will operate in normal library hours from the library at Park Holme extending to 9.30 p.m. on Friday, August 29 and Wednesday September 3.

Before council's centenary meeting on Tuesday, September 2, local mayors will radio congratulatory messages to Marion Mayor Kevin Hodgson.

On the same day radio operators hope to contact Marion's twin city El Paso, Texas, and speak to Mayor Jonathon Rodgers.

After the council meeting, a centenary dinner will be held at Marion Hotel where the guest speaker will be SA Governor Sir Donald Dunstan.

To involve all residents in the celebrations a centenary ball will be held at Westfield Marion on Saturday September 20.

Admission to the dinner, entertainment and refreshments will be $22, and tickets are available at the council office.

Marion celebrates its centenary

The Council o[illegible] Sou-Wester, Tuesday, August 19, 1986 the midst of accelerating development despite the more general national forecasts of 'doom and gloom'

Within Marion's immediate development plans are the office tower at Westfield Shoppingtown which will provide six floors of office space and all retail facilities at the Quadrangle Restaurant

Plans are also under way for the Edwardstown district centre which will be a combination of supermarket, specialty shops and offices. This will be located adjacent Target on South Road

Mining, brickmaking and farming were the main facets of the foundation but is best known for its yards and almond g[illegible] This led to Marion gained the garden Adelaide

Land formerly zoned for [illegible] has been opened up at Coventry Park and there will [illegible] vide about 140 dwellings

Division of land applications have been lodged or most of the [illegible]re land within Marion

Mar[illegible] inal[illegible] s an[illegible] he area became [illegible] dust raised high [illegible] by the purchase of [illegible] tates of land by [illegible] Australia

It now has a p[illegible] tion of more than 7[illegible] making it the fifth [illegible] in the Ad[illegible]

statistical division, covering an area of 54 square kilometres

Mayors speak

[illegible] centenary [illegible]

Naracoorte Herald, September 26, 1986

Mayor of the airwaves

The mayor, Mrs Joy Baluch, took to the airwaves last week to congratulate the Mayor of Marion, Mr Kevin Hodgson on his council's 100th year.

Ten mayors from across the State took part in the link up which was organised by the Wireless Institute of Australia [illegible]ion, as Jubilee event on Tu[illegible]

Mrs Baluch tuned into an amateur radio the president of the mateur Radio Club

ongratulated Mr ll of the residents nd spoke of her n district coun

Mr father stev was des- council from

s relatives still reside in Marion.

There are times when I misbe have my councillors say I picked up my bad habits from my ancestors in Marion," she told Mr Hodgson.

Mr Hodgson thanked Mrs Baluch for her good wishes and replied: "If you have any bad manners you shouldn't have got them from Marion."

Distinct C[illegible]uncil of Marion 1886 [illegible]ssumed on September 2 than 70,[illegible] population of more Western Adelai[illegible] the South

Ma[illegible]s from Port [illegible]ocoan Why alia Port Augusta, Port Pirie Ren mark Murray Bridge Victor Har and Naracoorte, Mount Gambier broadcast took part in the

The Member for Hayward, Mrs June Appleby, spoke on behalf of the Premier, Mr Bannon, to close the broadcast

Guardian Messenger, Wednesday, August 27, 1986

South Australian regional newspapers provided strong support for the J150/Marion Centenary Special Event Station. The coverage brought amateur radio to the notice of over 280 000 readers.

TV TOO — Viewers saw operators link country centres during news telecasts on Channel SA Loxton, Channel 4 Port Pirie, Channe 6 Eyre Peninsula and Channel 5 Port Lincoln.

VI5JSA CELEBRATES MARION CENTENARY

'Serving the Community Through Amateur Radio'

John Hampel VI5SJ
Marion Centenary J150 Amateur Radio Co-ordinator
16 Mitchell Street, Glengowrie, SA. 5044

This development of a simple idea into a full scale special event station focuses on the potential which may exist for radio groups to draw attention to the role of the Amateur Radio Service in their local community.

In December 1985, a notice in the Marion Library invited groups to utilise a display area in the foyer to attract local interest in crafts or hobbies. Ideally, there would be links with historical material, periodicals or books on the particular theme as a Jubilee 150 event during 1986.

A glass case offered secure storage for old radio equipment, magazines and documents. The adjacent area suggested an ideal site to set up a special event station and QSL display.

An initial contact with Miss Margaret Campbell, Special Activities Organiser at the Library, met with enthusiastic response. A suggestion that further areas within the library-proper be used for demonstrating various facets of amateur radio was also approved.

A program for the WIA (SA) Jubilee 150 Special Event Station was already well under way when the project was endorsed by the SA Divisional Council at the end of February 1986, so the operation would need to be in the latter half of the year.

Further meetings with Miss Campbell set the date for a period which would include September 2, the date of Marion Council's Centenary. By the time we both met with Assistant Town Clerk, Jeff Tate, to finalise arrangements, the operation was scheduled for August 29, to September 5, adopting the theme *Service to the Community Through Amateur Radio*.

A suggestion that the special event station should link up with other centres throughout the State so that mayors could send their messages of congratulations to Mayor Kevin Hodgson, was quickly approved by His Worship. Various clubs or individual stations were then contacted and accepted the role of providing communications for this event.

When the much revised project was finally passed by a Marion Council meeting in June, the JSA Station had already spread the message of the State's Birthday in 1986 from Cape Willoughby Lighthouse on Kangaroo Island, across the Nullabor on the Indian-Pacific and from various South Australian centres on board the Trade Train. Now amateur radio would add the Council Centenary which had been included as a Jubilee 150 event. Council's approval was also secured to issue a Marion Centenary Award to mark the celebrations.

The rather small project envisaged at the outset had grown to a considerable operation. Initial support was slow to the point where a scaling-down to a simpler operation was considered even in late July. However, with almost uncanny timing, responses started to come in and a full roster of operators and installation personnel could be completed before this drastic move was necessary. The success of the project was assured by all those who are acknowledged through the photographs of the station or in references later.

Further concern was a lack of response from amateur radio clubs in Texas. During 1986, Jubilee 150 was linking South Australian cities and towns with "twin-towns" in that state, also celebrating its 150th birthday. Marion's sister city was El Paso, where Mayor Hodgson had visited over Easter and had met with Mayor Jonathan Rogers. It was planned to establish a 14 MHz contact on September 2, to exchange greetings.

Fortunately the J150 amateur radio co-ordinator, Graham Horlin-Smith VI5AOZ, had now arrived in the US on a trip which extended the J150 radio operation, as he signed VI5JSA/W5 and /W6. During a contact with Graham from Los Angeles, he confirmed that mail had gone astray but reassured us that arrangements had been made with Jack KB5OV, past-President of the El Paso Club. Earlier, ideas were revived to secure the use of a four-element beam for 14 MHz contacts.

Meanwhile, responses to Sunday morning VI5WI Broadcasts started to come in, offering old radio equipment. As some of the items were from amateurs who would be away on holidays in August, a mini-museum developed at the home QTH as the items were dusted-off and prepared for display.

Cataloguing and arranging the various pieces was taken over by Jack Peatfield VI5AF and Peter Thomas VI5ZPT. Peter has a unique collection of vintage equipment. He is a member of the Historical Radio Society of Australia and corresponds with enthusiasts in other countries. This ensures that his restorations are carried out with exacting accuracy. Many of his pieces were included in the display.

On Saturday, August 23, Peter Maddern VI5PRM, marshalled his antenna crew — Alan Roocroft VI5ZN, David Doye VI5KDD, Gordon Welsh VI5KGS, Don McDonald VI5ADD, David Oates VI5ADO, Rod Durbridge of South Coast ARC and Lindsay Collins VI5GZ. Erection of WIA trapped dipoles and a Hustler trapped [illegible] from the Adelaide Hills ARS started smoothly, but a sudden weather change soon slowed things down.

Rowland Bruce VI5OU, arrived triumphant that he had found the 204BA beam which had eluded all until now. Peter reworked the antenna location so that the 'monster' could be used. The crew were not so enthusiastic as the rain became heavier! Negotiating the beam into position on the slippery roof was a tricky exercise. By now, the Library had fortunately closed to the public so that borrowers did not have to fathom the strange language coming from the rooftop — they were certainly not technical expressions!

Rowland joined John Mount VI5EV, and Grant Willis VI5ZWI, and the ATV VHF antenna installation proceeded more smoothly on the other side of the building. By 2 pm, everyone had abandoned the rooftop. The bedraggled group sipped coffee and decided to come back the next day just as the rain ceased. Within 10-minutes of everyone arriving back at their rooftop posts, Murphy exceeded himself. The rain returned with a vengeance, this time with wind gusts which made securing guy lines an exciting experience. The crew stuck to it and finalised with all antenna in place, coaxial cable through circuitous paths to the foyer by 4 pm. Originally, it was estimated this would be a two-hour job!

VI5JSA operated from the Marion Library at the Council Administration Centre, eight kilometres south-west of Adelaide.

The area, proclaimed a District Council on September 2, 1886 flourished as a rural community supported by market gardens, fruit and almond orchards and extensive vineyards. The vegetable growing gave way to housing as the Town Council was proclaimed in 1944.

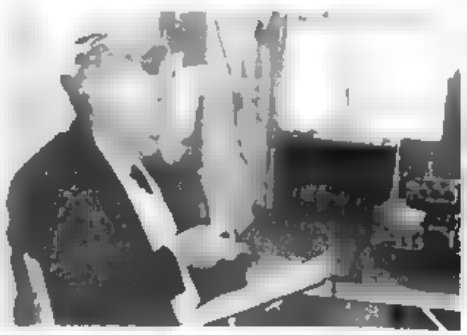
The suburban spread overtook the orchards and vines as the area was proclaimed a City in [illegible].

Today, the housing development is flanked by vigorous industrial activity on the southern boundary of the total area of 5430 hectares, as the Council celebrates a 'Century of Service' to a community of 70 550.

Photograph courtesy Jack Peatfield VI5AF

"... through these facilities provided by the WIA (SA), it has been an exciting 20 minutes speaking to various mayors throughout South Australia as we celebrate the Centenary of the District of Marion. On behalf of the Council and the people of Marion, I thank all those radio operators who have made this possible." His Worship the Mayor of Marion, Kevin Hodgson.

MAYOR PAYS TRIBUTE TO AMATEUR RADIO



Photograph courtesy Paul Richardson VI5BVR

Speaking to Mayor Hodgson at Marion, His Worship the Mayor of Naracoorte, Neil Smith commented; "... amateur radio has, in so many ways in the past, been of inestimable service and assistance in making contact across the airwaves when other, more sophisticated means have been unsuccessful. So it is fitting that on this historic occasion, amateur radio, through the J150 station VI5JSA, should make it possible for me and other mayors to recognise your achievement of 100 years of Service to the Community."

The antenna compliment was trapped dipoles for 3.5, 7 and 14 MHz, at about six metres above the roof with the 204BA beam for 14 MHz about another four metres above them. The antenna farm was topped by the all band trapped vertical. For ATV there was a long boom Yagi, a stacked collinear panel, plus a J-pole for 144 MHz liaison.

When we arrived at the Library on Monday morning to complete the equipment installation and various displays, the rooftop attracted much attention. The 204BA looked impressive locked-off on its beam path to El Paso, Texas, but we were less than impressed as it flapped up and down in the high wind. There would be many times that day when one of the group would slip outside to check that all was well up-top.

When the station opened on Tuesday, August 26, at 0001 UTC, the public were greeted by an extensive display. The entrance foyer had been transformed into two complete HF operating positions each side of the display case. Hundreds of QSL cards formed a checker board pattern on the red wall beyond. Just inside the library entrance a RTTY station on 7 and 14 MHz demonstrated various teleprinters, tape perforators and readers.

The attractive WIA display dominated the centre of the Library. This stand received a constant stream of inquiries, many from would-be amateurs. Brochures on the hobby, copies of *Amateur Radio*, literature on examination procedures and Amateur Television were in constant demand.

Other displays which attracted interest were QSL cards from the Royal Naval Amateur Radio Society, while another told the story of ALARA with QSL cards and photos. Both of these were prepared by Bernie Edwards VI5ABG.

Peter Koen, Secretary of the 2nd Adelaide Scout Group ARC, VI5BPA, contributed a multi-panel display of JOTA stations and camps from recent years which drew attention of younger visitors to the Library.

The amateur television was always popular when stations transmitted from their metropolitan and country stations via the Adelaide ATV repeater at O'Halloran Hill. At other times, a short video tape, prepared by John Ingham VI5KG, played continuously on the monitor — *Amateur Radio the National Resource of Every Nation.* This tape initiated further inquiries about our hobby. (It is an excellent public relations presentation which is commended to any other club groups who stage a public demonstration to promote amateur radio).

Thursday, August 29, was a worrying day for the operators on duty. Adelaide experienced wind gusts up to 114 km/h. Two guys broke away allowing the 204BA to see-saw as its element tips touched the roof. It was also an experience we would not like to see repeated when the vertical assumed an almost horizontal position as it whipped back and forth — Lindsay VI5GZ left his CW post to attempt temporary repairs with equipment he luckily had in his van. At one point, he was close to being swept across the flat roof as the wind thrust both him and a ladder up against the masting.

Lindsay managed to prop up the main antenna support by forcing the ladder under the beam's boom, where it remained until the station was dismantled nine days later. He also reported that we had lost the trapped dipoles which were now scattered as pieces in various directions. As soon as the wind subsided, Don VI5ADD helped Lindsay rig an inverted Vee dipole from a convenient gum tree. This antenna proved to be a most useful radiator on 3.5 MHz in the following days.

Friday evening, August 29, was one of the extended hours operations and a busy time for all concerned. During the evening, seven different transmissions kept the VI5JSA call sign active on the 3.586 MHz J150 Net, CW on 7 MHz, HF RTTY on 14 MHz, VHF RTTY on 144 MHz, ATV liaison on VHF; a base station working the Adelaide repeater and various hand-helds working simplex on 144 MHz.

When the station closed at 9.30 pm, His Worship Mayor Kevin Hodgson, accorded the operators and helpers with their wives a Civic Reception at the adjacent Council Chambers. During the evening, the Mayor and Mrs Hodgson, had shown keen interest in the activities at the Library. They participated in some of the transmissions from VI5JSA and received congratulatory messages on phone and RTTY. A highlight was when the Mayor acknowledged wishes on ATV — the first time he had seen this mode in use. His only previous contact with our hobby had been when his son had participated in JOTA from the station of Bob VI5MM.

The Mayor thanked about 50 guests for their participation in the Special Event Station and spoke at length on the important role of amateur radio in every community. John VI5SJ responded on behalf of the group and Jenny Warrington VI5ANW, President of the SA Division, acknowledged the Mayor's thanks to the WIA.

Centenary Day, Tuesday, September 1, was the highlight of the operation. Conditions on 14 MHz, up until then, had been atrocious with very few DX contacts. However, right on 1.30 pm schedule, Jack KB5QV, called "El Paso, Texas calling Marion, South Australia." Adam N6JFG and Chuck VK6CF, were also on 14.286 MHz to help with relays.

Initial disappointment came when Jack advised that Mayor Rogers could not be available for personal reasons. However, an interesting few minutes of exchanges between Mayor Hodgson and Adam followed when they found they had mutual friends in Los Angeles, whom Mayor Hodgson had visited on his recent US visit.

At 6 pm, VI5JSA called-in stations for the exchange of greetings from mayors of country centres. The conditions on 3.675 MHz were perfect for this history-making amateur radio broadcast. A tape recording, made by Bill Smith VI5ASW, of 25-minutes duration, has been copied for presentation to the various mayors who took part.

Intensive early planning, tight operating procedures and careful attention to every small detail by the network of country stations, who demonstrated the efficiency of our communications facility, brought high praise from all the mayors who were involved. Honorary Marion Awards were forwarded to the individuals or club stations who participated. Awards certificates were also presented to each of the mayors who spoke to VI5JSA Marion.

Over 8000 visitors and library borrowers saw and heard amateur radio serving the community by celebrating Marion's Centenary. The original concept of an all-embracing operation beyond the usual special event station contacts had been fulfilled. Inquiries from the visitors confirmed a better understanding of our hobby. Both young and old potential future amateurs have been noted at radio clubs and WIA meetings, seeking information on how to enroll in novice classes.

When Nick VK2VYS, just managed to make the last contact with 30 seconds to spare after a hectic drive to reach home and be eligible for a Marion Award, 923 QSOs were in the log after 10 days operation. Maria VI5BMT took on the chore of sorting the special QSL cards which were sent to every station. She also kindly typed this article.

At the time of writing (mid-October), 130 Awards have been processed. Further applications will be accepted as QSL cards reach stations via the Bureau. Full details of the certificate appeared in the Awards Columns of *Amateur Radio* September page 40 and October page 50.

As over 90 amateurs contributed to the success of this project, it would be very easy to overlook some acknowledgments. As co-ordinator, may I express sincere thanks to all involved, even if you have been omitted. Your reward is in the satisfaction of promoting our hobby — in every sense 'Serving the Community Through Amateur Radio.'

TWO J150 EVENTS LINKED BY RADIO

A Jubilee 150 event during August was the re-enactment of horse transport of wool bales by a team of 11 Clydesdales — a sight which attracted large groups of sightseers as they progressed through each country centre.

Atop this spectacle for part of the journey, on Wednesday, August 27, near Tarlee, 80 km north of Adelaide, was Steve Mahoney VI5AIM, complete with hand-held.

Contact was made with VI5JSA Marion via the Adelaide 144 MHz repeater for an appropriate exchange of greetings.

Steve, who signed *Woolpack/Clydesdale Mobile* commented on the excellent conditions via the repeater and "...this zero ignition interference is terrific!"

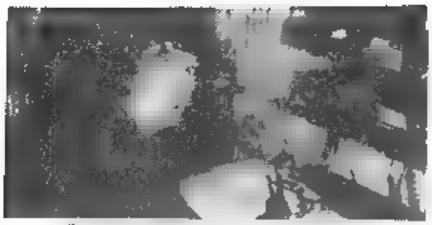
Photograph courtesy Peter Koen

Two of the Young Ladies, Maria McLeod VI5BMT and Myrna Mamie VI5YW, who kept 7 MHz SSB active despite poor band conditions during daytime operation.

Photograph courtesy Peter Koen

Jenny Warrington VK5ANW, SA Divisional President, presents the WIA history cassette *Sounds of Amateur Radio* to Miss Blanche Landers, Chief Librarian of Marion City Library. A recording of the Mayoral exchanges transmissions will also be available for loan from the Library's Audio-Visual Section.

MAYORS SPEAK TO MARION VIA VI5JSA



Photograph courtesy Transcontinental

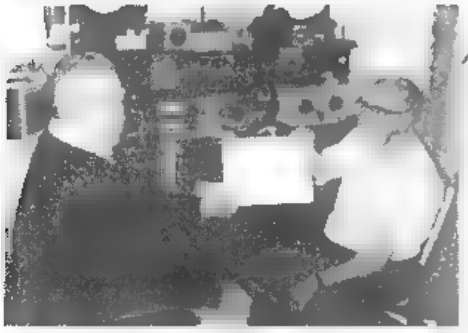
The Mayor of Port Augusta, Joy Baluch, spoke to Marion from the Port Augusta Amateur Radio Club, operated by the President, Bill Offler VI5BWO. Mrs Baluch told Mayor Hodgson the radio exchange was a further link with the area as her great-grandfather had been District Chairman of Marion Council in 1892.

Photograph courtesy Whyalla ARC

After speaking from club station, VI5BWR, Her Worship the Mayor of Whyalla, Mrs Aileen Eckblom, receives her Marion Award from John Thompson VI5BWB, Secretary of the Whyalla ARC.

Photograph courtesy Port Lincoln Times

Carol McKenzie VI5PWA, President of the Lower Eyre Peninsula RC, visited the Marion Station during the day, then flew back to present an award to His Worship the Mayor of Port Lincoln, Tom Secker, after speaking from VI5ALE.



Photograph courtesy Jack Lester VI5LR

Another South Australian Radio Pioneer who took part in the historical broadcasts was Jack Lester VI5LR, who presented His Worship the Mayor of Victor Harbour, Eric Ashby, with his award. Jack used his station at Inman Valley for the Mayoral congratulations.

Photograph courtesy Port Pirie Recorder

Some of the 20 members of the Mid-North ARC who welcomed Port Pirie's Deputy-Mayor, Charles Robertson, to the microphone at VI5PP. From left: Joe Burns VI5UJ, Treasurer Kevin Watts VI5PKG, Secretary Graham Phillis VI5AGP, Kingsley Francis VI5NFK, Leslie Stephens (President's wife), Harry Johnston VI5AAJ and President, Bill Stephens VI5AWS.

Photograph courtesy Doug Head VI5NDH

Jennifer Warrington VI5ANW, President of WIA (SA); "... on behalf of the Council and member of the South Australian Division of the Wireless Institute of Australia, radio amateurs congratulates the City of Marion... I now have pleasure in introducing Mrs June Appleby, MP, Member for Hayward..."

Photograph courtesy Doug Head VI5NDH

Mrs Appleby; "...on behalf of the Premier John Bannon, who is unable to be here personally, on behalf of our State, I must thank the Wireless Institute of Australia for making this historic broadcast possible over the Special Event Station, VI5JSA. By amateur radio, I convey congratulations to Marion achieving its Centenary — on behalf of the Premier, the Government and people of South Australia."

Photograph courtesy Murray Pioneer

His Worship the Mayor of Renmark, Lloyd Sims, conveys congratulations from the Riverland to the people of Marion, using the station of John Ruston VI5ARK.

Photograph courtesy Richard Bowyer VI5NRB

His Worship the Mayor of Murray Bridge, Ray Helps, at the microphone of the Lower Murray ARC, VI5ALM.

Photograph courtesy J Richardson

His Worship the Mayor of Naracoorte, Neil Smith, receives his Marion Award from Paul Richardson VI5BVR, who operated the Naracoorte ARC station, VI5ARN.

Photograph courtesy Trevor Niven VI5NC

His Worship the Mayor of Mount Gambier, Don McDonnell, speaks to Marion from VK5SAJ/5SR, the club station of the South-

PUBLICITY PAYS OFF

About 130 letters were sent to Clubs, Nets and WIA Broadcast Officers. This publicity was appreciated as many stations commented on hearing the news in their area.

For one station, Peter Sampson VK4MKT, of Middlemount, it meant the possibility of a family reunion by radio.

Peter's mother arrived at Marion a few minutes before 6.30 pm saying she had received a letter about VI5JSA and hoped she could speak to her son. Conditions were doubtful to VK4 at that time on 3.586 MHz, but right on 6.30 pm, there was VK4MKT, loud and clear!

It was a warming experience for all who heard the happy exchanges of family news after a long parting. Luckily, Gordon Welsh VI5KGS was monitoring and made a tape recording which, it is felt sure, will be valued by the family.

Mayor Kevin Hodgson, later commented on the value of 'Serving the Community through Amateur Radio' in this way. He was pleased that it was the Marion station which made it all possible.

Photograph courtesy Peter Koen

Jennifer Warrington VI5ANW, President of the South Australian Division presents Marion Centenary Award Certificate No 1 to Mrs June Appleby MP, following her contact with VI5JSA through VI5WI.

An earlier plan to demonstrate cameras and a television transmitter in the Library was changed because of the complexity and hours involved in setting up for each session.

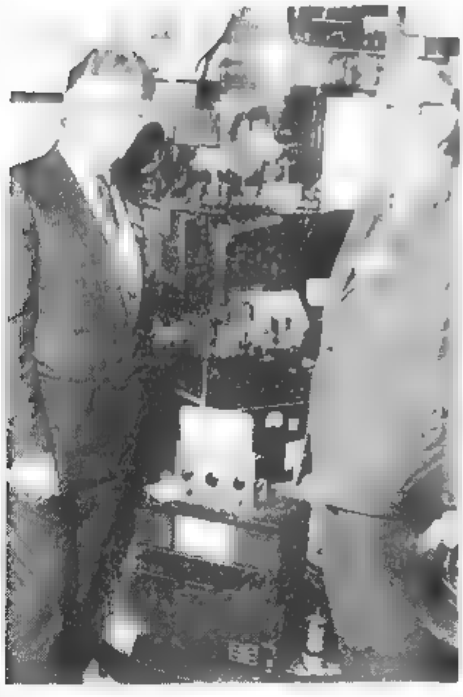
However, avid ATV enthusiast, John Mount VI5EV, rallied the SA ATV Group to transmit from home stations. Video greetings with caption cards of "Congratulation to Marion by Amateur TV" appeared on the screens at regular intervals.

John's dedication to this part of the station was admired by all who knew the hours of organising he devoted to making sure it would be a success. He was most ably assisted by Grant Willis VI5ZWI, so that there was always something for the public to see and prompt a steady flow of inquiries.

The following members of the SA ATV Group are thanked for their operating time, loan of equipment or preparing special tapes to transmit to an appreciative audience.

Jim VI5ZSA (Kadina), Bill VI5AWS (Port Pirie), and Ron VI5ZVA (Whyalla). These stations were cross-linked via the Mid-North Repeater.

John VI5KG, Bill VI5KTV; Rod VI5AWA, Dom VI5ZDG, Chas VI5ACF, Graham VI5ZGV; Trevor VI5ATW; Jamie VI5ZAA, George VI5GG, Lee VI5NK, Ben VI5ZBA, Brian VI5KBU, Greg VI5ZBD; Tony VI5ZTC; Mike VI5KMJ, Bob VI5ZAX; Dave VI5ADV and John VI5ZZ.



Photograph courtesy Peter Koen

South Australian Federal Councillor, Rowland Bruce VI5OU, with radio pioneer Gordon Regless (ex-VK5GR), inspect the display of old equipment. Gordon recalled using many of the 1930s sets and components loaned for the exhibition. A happy coincidence was that, in the case, there was a 1936 *QST* which carried the VK/ZL Contest Results when Gordon was Contest Manager.

NOSTALGIA AT MARION

Some of the early equipment on display included a 1919 set used by the BEF in France during World War I (believed to be the oldest working set in Australia), a 1924 Crystal Set made by Green Bros, Norwood, SA, a restored 1927 three-valve English receiver and parts from the Spark Transmitter of XVT (Charlie Othen A5ON-VK5ON).

Early editions and anniversary issues of *Amateur Radio*, old *QSTs* (including No 1, dated December 1915), and 1920s text books drew appreciative interest. Colin Heath VI5FX, loaned 1936 RSGB, BERU and ARRL Awards from the estate of his brother Alan (late-VK5ZX). From the same collection were most of the pre-1939 QSL cards with exotic prefixes which formed the backing for the display.

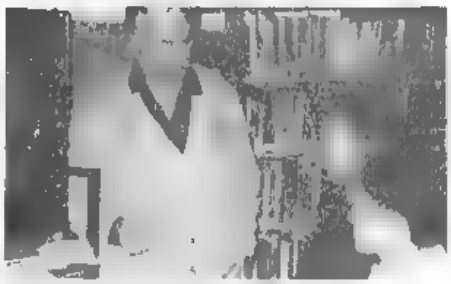
Commercial receivers included a Hammarlund HQ-120, National HRO, Hallicrafters SX28, Kingsley AR7 plus KS9er, Eddystone 640 and 770.

Word War II disposals equipment used by amateurs included BC348, B28 receivers, Type 3 Mark II, FS6, 108, No 11, No 19, and No 62 transmitter/receivers; BC221 by Bendix and Class C Wavemeters from AWA, together with numerous other test equipment units.

Fine examples of home-brew equipment and owner built components also were shown. From many of the younger visitors came the question: "What is a valve?"

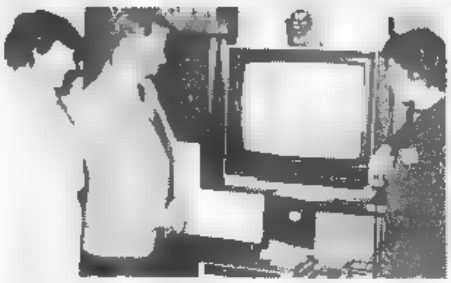
Equipment was loaned by:

Brian VI5CA, John VI5BL, Colin VI5NCE, Peter VI5PRM, Bernie VI5ABG, Lionel VI5ACW; Bill VI5FR; Colin VI5FX, Marshall VI5FN; Gordon VI5KGS; Ron VI5ON; Peter VI5ZPT and John VI5SJ.



Photograph courtesy John Hampel VI5SJ

John Mount VI5EV, explains ATV to Amber and Tiffanae Kenna. The girls had travelled 20 km to see the displays after reading publicity in their local newspaper.

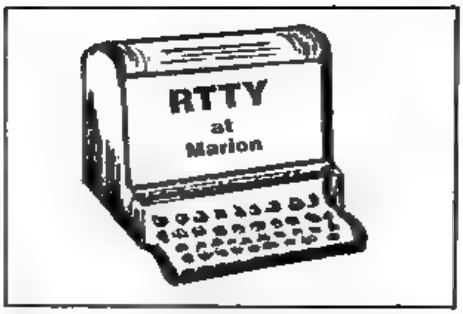


Photograph courtesy Peter Koen

Mayor Hodgson and Mrs Hodgson received congratulatory messages via ATV. During the evening the Adelaide Repeater, VK5RTV, at O'Halloran Hill, was cross-linked with the Mid-North Repeater VK5RCN. The operator for this link-up was young ATV enthusiast, Grant Willis VI5ZWI, who had passed his limited licence examination only four days earlier.

Photograph courtesy John Rampal VI5SJ

During the open night displays, Jack Peatfield VI5AIF, always attracted an interested audience as RTTY congratulations to Marion Council came in on 7 and 14 MHz.



A RTTY station was set-up to provide contacts on this mode on 7 and 14 MHz using a FT-200, Siemens 100 plus a tape perforator and tape reader.

The few stations who used RTTY to contact VI5JSA sent congratulatory messages which were displayed in the library as they came in.

A prepared tape was used to print-out souvenir texts about the station to hand-out to visitors.

The operating area was complimented by a static display of early Model 12, 14 and 15 machines.

Shorter periods of operation provided opportunities for RTTY contacts on 144 MHz.

The interest shown in this mode indicates that a special event station should include RTTY in planning, as the interest generated will be worth the effort

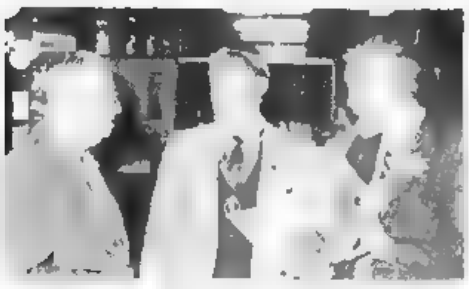
Photograph courtesy Peter Koen

Chris Owen VI5UH, at the keyboard of his home-brew terminal equipment while operating VHF RTTY. Many inquiries came from younger radio enthusiasts who were interested in this mode of amateur radio transmission.

TO JUBILEE STATION VI5SJA — CONGRATULATIONS TO MARION COUNCIL ON YOUR CENTENARY (by RTTY)

Photograph courtesy Peter Koen

Some of the 50 guests at the Mayoral Reception listening to Mayor Hodgson thanking them for their support to the Marion Centenary Celebrations. The Mayor expressed appreciation on behalf of Council and the people of Marion for the continuing contribution of amateur radio in the community.

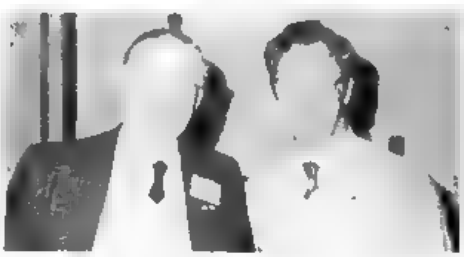


Photograph courtesy Peter Koen

Gordon Ragless (ex-VK5GR), recalls memories of his early radio days as a young radio operator in the Marion District and founder of the Blackwood Radio Club, VK5BR (now Adelaide Hills Amateur Radio Society, VK5BAR), to Mayor Hodgson. The equipment he used is now in the Telecom Museum, Adelaide and features in the book *History of Marion on the Sturt* held by John VI5SJ.

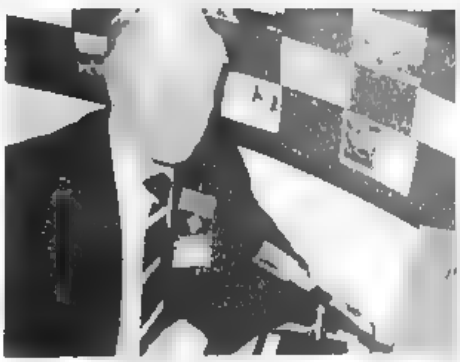
Photograph courtesy Peter Koen

Don McDonald VI5ADD, Secretary of the South Australian Division, with Ron Burt VI5ON, who loaned many radios and documents, dating back to 1913, of his late father-in-law Charlie Othen (ex-XVT and VK5ON), Lindsay Collins VI5GZ (CW), and Jack Peatfield VI5AIF (RTTY).



Photograph courtesy Peter Koen

Old Timer, Clem Tilbrook VI5GL, whose crystal grinding expertise was eagerly sought by amateurs throughout Australia, now devotes his time exclusively to ATV. Clem is seen here with Gordon Welsh VI5KGS, Secretary of the Adelaide Hills Amateur Radio Society, whose members assisted with equipment and operators.



Photograph courtesy Peter Koen

Alan Roocroft VI5ZN, has been involved in most JSA Special Events during the year. His brisk procedures and courteous operating were appreciated by all who contacted the Marion station.

Photograph courtesy Peter Koen

Lindsay Collins VI5GZ, assists the antenna team on HF while the ATV Group ready an impressive array for VHF. Lindsay contributed over 70 hours to the project. His Auto-CW Keyer (see AR, May 1986) attracted interest as he maintained CW contacts on the Jubilee 150 frequencies.

A GUIDE (!) TO JOTA

During Jamboree on the Air, many children and adults pass through Jamboree station.

David Johnson VK3YWZ
62B Naples Road, Mentone, Vic. 3194

Last year, marked my fifth year of involvement in the Annual Jamboree on the Air (JOTA). This gathering together of Scouts and Guides with radio amateurs has done much to stimulate communication between members of the Scouting and Guiding movements, world-wide. The event occurs on the third full weekend of October each year. Activities start for most groups on Saturday, the previous night being taken up by antenna erection and setting up of portable stations.

Many children and young adults pass through Jamboree stations. While there, any number of activities await them. For some it is building simple electronic kits, for others field communications orienteering, but the mainstay is talking with other stations.

Ambitious endeavours by groups have seen RTTY, ATV, Facsimile and ASCII employed to bring the groups together. The limits of the activities are only set by the ideas of those involved, and the preparation and time to see the ideas implemented.

PLANS AND PREPARATIONS

Just as in any other endeavour, time spent in planning is never wasted. To many of the Scout and Guide Leaders, JOTA is an unknown field. They will appreciate some guidance on what will be available, and on the expectations of themselves. This briefing pays big dividends on the weekend.

Murphy's Law ensures that the moment you drive up to your station for the weekend, you will remember *that* important item left on your shack bench. This is not much of a problem if you are portable at a local hall, but when you are camping two or three hours drive away, it is frustrating. And almost invariably, the electronics stores have just closed for the weekend.

Make a list over the previous two or three weeks, and check it before you leave home. Even with a list, 1986's activity saw me forget one or two minor items.

Planning for 1986 JOTA began for me on the last day of JOTA 1985. Over the following 12 months, I defined my goals, briefed the leaders in two meetings, built some new items of gear and prepared my set of connectors and cables.

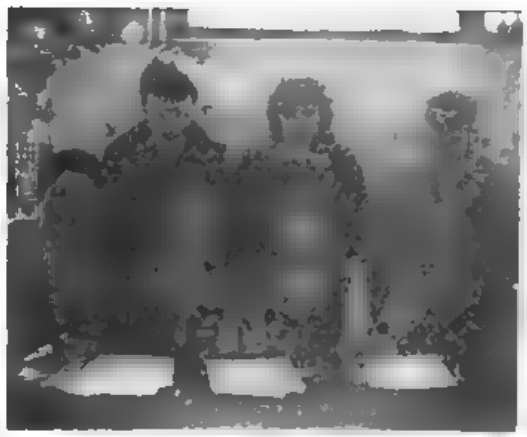
IT NEVER WORKS FIRST TIME!

The complete set of equipment was then taken to Bayswater, and unloaded. Fine weather greeted the erection of the mast, a lucky thing since a couple of mast clamps needed persuasion. But, the mast was soon up, the cables run into the hall and testing and assembly began.

The main antenna support was my 10 metre homebrew telescopic WICEN mast. Atop this was the 16 element VK3UR ATV Transmit Beam. This was flanked by halfwave verticals on two metres and 70 cm. ATV was fed with half-inch Heliax, and the others with RG-213 and N-connectors were used throughout to minimise loss and ensure waterproofing. The weather soon showed this decision was worthwhile.

The station comprised a TS-520 on HF, FT-290R with PA on two-metres and FT-430R with PA on 70 cm. The ATV transmitter comprised the ubiquitous RoadShow Gang Exciter and Modulator boards, feeding Mitsubishi PA Modules. Power for the system was supplied by a homebrew 15 amp device finished only two weeks previously. Unfortunately, it's over-voltage sensor proved sensitive to HF and tripped out with annoying regularity.

With the help of Neil VK3BCU, an ATV station was set up. Some problems arose, starting with the absence of the correct power cable for a borrowed porta-pack. In addition, I had never used the transmitter before, the antenna had never 'accessed the device' before and my home signal was too bad to adequately check the receive system.



From left to right: Michelle Dodson (2nd Bayswater Guides Leader), Marianne Punshon (4th Bayswater Guides Leader), Frances Campbell (3rd Bayswater Guides Leader).

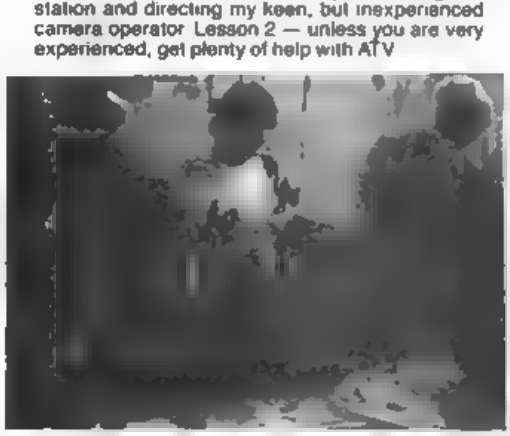
Seated: David Johnson VK3YWZ, Nadine Clode (2nd Bayswater), Janine Hedley (4th Bayswater) and Siobhan Punshon (3rd Bayswater).

ON AIR AT LAST

The whole project was ambitious. With hindsight, I would say improbable. But after working until 3.00 am, it all came together, in a fashion. The porta-pack was powered up and interchanged with video from a second camera and graphics from my computer. The video was 'conditioned' through a VCR and the result was acceptable.

Pictures were sent, and received, and everything worked. Unfortunately, video 'hash' was desensing the two-metre receiver and 'wiping out' some weaker signals. Lesson 1 — Use a different mast for your ATV transmit antenna, otherwise desensing and video 'hash' will spoil reception.

Saturday dawned, seeing us exchanging pictures with David VK3UR, Richard VK3YLH, and Andrew VK3KIR, at Waverley. The children had a lot of fun and two Guides in particular enjoyed cross-band QSO with Scouts at VK3SCO, located in Cheltenham. I was kept busy controlling the station and directing my keen, but inexperienced camera operator. Lesson 2 — unless you are very experienced, get plenty of help with ATV.



Making kits: David Swallow VK3YXE helped by Frances Campbell, Marlene Lamont and Lynette Prislam.

AIMS AND GOALS

My first intention on planning the weekend, was to stimulate interest in amateur radio. With Guides, this can be difficult, they are often shyer than Scouts. However, the job was made easier by the Communications Activity Badge. We decided to give the girls the chance to earn these badges.

Assistance from Jim Linton VK3PC, saw the girls tested in Morse code. (Since I am AOLCP, I felt some help might be wise!). While there, Jim also tested the girls on the theory aspects of the badge, and prepared them for the weekend's activities. All this in the three weeks leading up to JOTA.

On the weekend, he also found time to help with the operation of the station, and briefing of the extra girls who arrived on the Sunday. The end of the weekend saw one Guide unit fully tested, and two others programmed for final testing by the end of the year.

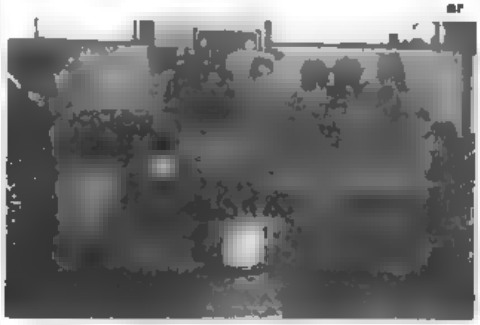
One of the stumbling blocks was the practical kit exercise. After some research, a flip-flop design was settled on. Produced by Chris Bell and Steve Maidment of Cheltenham Scouts, it was the ideal kit. They 'came to the party' with 50 kits for the girls to build. Now, who was going to supervise construction?

An old friend stepped in and organised the whole thing. David Swallow VK3YXE, arranged the tools, arrived on Saturday and took 32 girls through the kit from opening the bags to plugging the battery in. He had a minor problem when some of the girls demurred at wearing safety glasses while soldering. I still do not know how he persuaded them, but he did! Perhaps he convinced them about 'guys", 'passes' and "glasses"!

After that it was all plain sailing. The girls worked out their microphone shyness (through group involvement) and talked quite happily to other groups. The leaders were there to help the girls, and one of the guides helped out as part of her *Baden Powell Guide Award*.

During the period, over 100 girls had visited the station. Thirty had completed their Communications Badge and 40 are programmed for completion by the end of the year. Letters from the girls expressing their appreciation and video and photographs reflect and record its success.

I am delighted it went so well and have already promised to be at next years JOTA. Next year's video will see some initiatives, and we might even try some fox-hunting. Some more help can be arranged, with adequate preparation and briefing from Rangers and BP Guide applicants. I will utilise this help more next year. What about you?



Sending ATV: Carolyn Swallow (wife of VK3YXE), David Johnson VK3YWZ, Monica Vollmer, Lynette Prislam and members of the 3rd and 4th Bayswater Guide units.

Thumbnail Sketches

Joe Ellis VK4AGL
Burnside Road, Nambour, Qld 4560

I've got a crystal set and I can hear music!

One Saturday in the summer of 1933, a mate of mine came down on his bike and said excitedly: "I've got a crystal set and I can hear music." Peter and I were 12-year-olds and living in Lismore, a country town in northern New South Wales, then in the grip of a world depression.

I hurried back with him to his home and sure enough, there was this wondrous instrument, and music was indeed issuing from the earphones.

Over subsequent nights, I shared an earphone with my friend, who told me that the set had been made by a friend of his father, and an expert on crystal radios. I sought an interview with this gentleman and one winter's night, found myself standing outside his front door.

Through the glass panels I saw a kerosene light come down the hallway and soon I was paying my first visit to a "radio shack." The man clamped a pair of headphones over my ears and said: "That's 3LO, Melbourne coming through nicely tonight." At that moment I became hooked on radio, a love affair that has lasted over 50 years. The man gave me a circuit diagram and the gift of a tuning condenser and the promise of help if I could not get the set going. I scrounged most of the parts, but I remember ordering a crystal and crystal-holder from Levensons, in Sydney. This was the 'in- place' for radio components in those days.

I finally got all the bits and pieces together and then came the moment of truth. Not a sound came from the headphones. I checked and rechecked the circuit, to no avail!

At the first opportunity I returned to the "expert's" house. Shock, horror. I found only smouldering stumps — burned down last night a bystander advised. What to do?

Why not take it down to the local broadcast station and see if I could get any joy alongside the transmitter site?

I did just that, attaching the antenna connector to an old rusty barbed- wire fence at the back of the property. Still no luck!

I was sitting on the grass contemplating suicide when a friendly voice said, "What's the trouble, son." It was George Exton, the owner of the station, so I poured out my troubles to him. "Well, my son will soon fix it for you," he said, "come on in, our afternoon session is nearly over."

I received a guided tour of the station — whirring generators, racks seemingly full of radio valves the size of footballs — I tried to show intelligent interest. "What's that" I inquired, pointing to a huge engine in the background. "That's our emergency supply," George said, "it's a gas engine connected to the main Lismore gas supply. We have only used it once. Every gas stove in the town went out and we were besieged with angry ladies whose dinners had been spoiled." George's motto was *Never spoil a story for the sake of the truth*.

When I left the station, crystal set operational, I had already decided to make "wireless" my career. I remained friendly with the Exton family long after their radio station had been taken over by big "business."

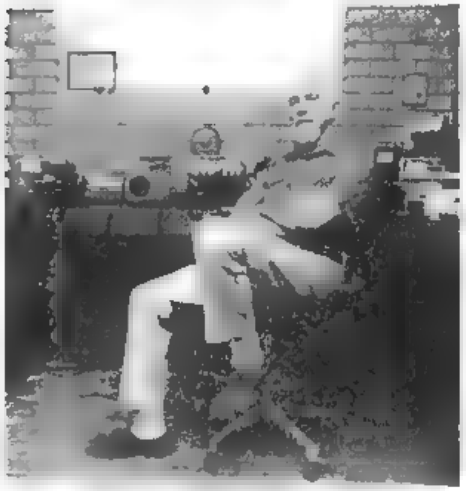
I was soon into valve radio, and in 1936, after spotting an article on a 56 MHz transceiver in *Popular Mechanics*, I made my first tentative experiments in the transmission mode. These spurious signals soon drew me to the attention of the local amateur radio operators, then grouped together in the *Richmond Rivers Listeners League*. They descended on me in a fairly heavy-handed way, insisting that I become respectable and get a licence.

With the friendly help of this group, and the Chief Telegraphist of the local Post Office, who trained me in impeccable Morse code at a speed of 15 WPM, passing the examination was a breeze.

During 1937, the radio pioneer, Marconi, passed out of this world about the same time that I obtained my Amateur Radio Operators Certificate. Despite even recent articles denigrating this radio pioneer, Marconi was my inspiration in those early days. Little was I to imagine that 20 years later I would meet and converse with his widow and his youngest daughter, whilst based in Rome.

The *Richmond Rivers Listeners League* operated under the call sign of VK2GL. It broadcast music on the 300 metre band. The drill was that we all went off to the movies on Saturday nights, came back and waited until 2UE, in Sydney, went off the air. We then tuned up on that frequency, and were then ready for the Sunday transmission.

As the youngest sprog about the place, my job was to collect and return the records lent by the town jeweller, but I finally got to do announcing as well! Under the tuition of these keen young enthusiasts, I learned how to solder and unsolder circuits of increasing complexity, forever chasing more power output or better receiving perform-



The shack in 1986.

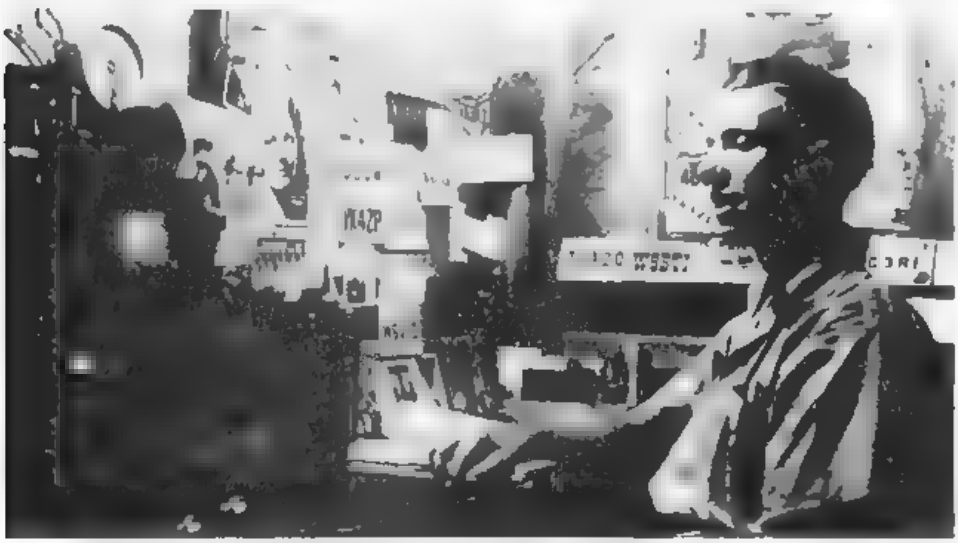
I assaulted receiving valves with plate voltages undreamed of by the manufacturers and was soon throwing out bakelite components in favour of ceramic, as the operating frequencies went higher and higher. I thought nothing of riding my bike really long distances to check-out amateur radio stations allegedly getting better results than myself. I soon discovered that the top operators lived in high locations and had big antennas, a lesson well learned and put into practice at this QTH.

Between all of this activity, I was doing a correspondence course with the Marconi School of Wireless, and the final papers coincided with the outbreak of World War II. My station and Yagi beams (monobanders on 10 and 20 metres), were dismantled and, like others in the town, I packed my bags and went off to join in this madness, as a ship's radio operator.

At the end of hostilities, I became custodian of the old Lismore Club call sign, VK2GL, and it appeared in the first Call Book issued during 1948 under my name.

I have always maintained the letters *GL* in my suffix ever since that date as a remembrance of the young friendly men who introduced me to amateur radio.

I often sit in my shack these days surrounded by elegant radio equipment and muse that none of this would have happened if my mate had not come down that summer day and said "I've got a crystal set and I can hear music."



The station prior to dismantling in 1940. In country areas, the equipment was stored in sealed containers at the local Post Office until hostilities ceased.

QSP

CANADA-JAPAN RECIPROCITY

On September 17, 1986, Canada signed a reciprocal licensing/operating agreement with Japan, to be effective from November 16, 1986.

This is the third country that the Japanese government has entered into such an agreement with, the other two being the United States and the Federal Republic of Germany.

Amateurs operating in Japan under a reciprocal licensing/operating agreement sign 7J, eg 7J1AAA in Tokyo, 7J1ACH on Minami Tori-shima, 7J3AAA in Osaka, and 7J8AAA in Sapporo.

Abridged from *The ARRL Letter* September 29, 1986.

How's DX?

Ken McLachlan VK3AH
Box 39, Mooroolbark, Vic. 3138

As usual, the January DX column has a guest writer contributing either their thoughts on doing or a profile of their history in electronics and the hobby we all enjoy.

This year's guest writer is none other than Percy Anderson VK3PA, known world-wide as controller of the Pacific DX Net on 14.265 MHz and the ANZA Net, 14.135 MHz and on 21.204 MHz when conditions are favourable. Percy is an avid DXer, who it is believed, has never applied for any DXCC awards. With the sunspot minima, the ANZA Net has been forced down to the DXers band of 20 metres. Percy has carried the chores of controller in excess of a decade and, in my opinion, would be a leader in the field of net controllers. In the time I have known him, there has never been heard a bitter vitriolic remark or innuendoes, even under heavy stress when a rare DX station has appeared, and these occasions have been innumerable over the years. Incidentally, the longest running nets are SEAnet, the Pacific DX Net and the ANZA net. Some other nets that have been operating for a similar period are the Maritime and the Travellers Nets, which are a great service to their participants.

Percy notes than many object to net operation, however they operate on one frequency taking up minimum spectrum space and allow amateurs with simple equipment, without linears and beam antennas, to work DX countries, alleviating trying to get through impossible pile-ups. Other benefits of nets, correctly run, are helping out during emergencies, which has been done on many occasions, and the welcoming of amateurs with physical handicaps, through patience and perseverance by the controller.

One such amateur was a quadraplegic who operated his equipment with a rod attached to his head by a suction cup. As Percy says, "It makes one think!" My comment is that this is what the hobby is about — helping others — in all forms and think of the horizons amateur radio opens for a person such as Percy was referring to. This person was only one of many with disabilities that joined the nets.

Percy is very critical of persons who have equipment capable of placing a signal on the amateur bands and they go out of their way to cause interference. Whether they are licensed, do not like nets, or others enjoying their hobby is their prerogative, but if caught (and many have been brought to ground) the authorities in all countries deliver harsh penalties for their misdemeanors.

A keen gardener, Percy has a garden which is a delight to behold. As I have seen it there is not one blade of grass would be game enough to become out of place or one shrub or tree drop a leaf. It is immaculate!

Percy first became interested in wireless, as it was then called, when attending West Melbourne Technical School, at the age of 14-years. A group of enthusiasts had the use of a room in the complex which was equipped with crystal receivers and some newer valve type equipment. At lunchtimes, Percy used to peer through the glass door as he munched on his sandwiches.

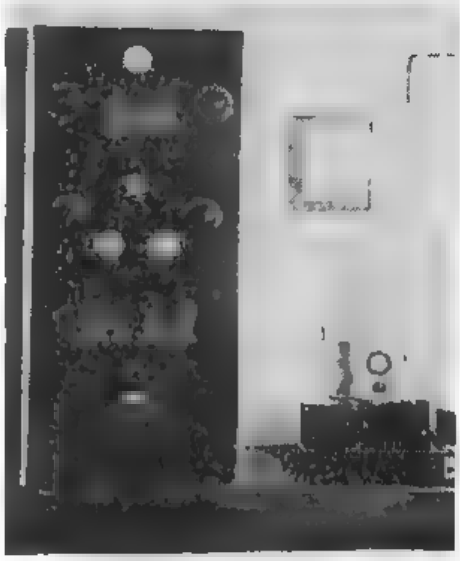
Curiosity got the better of him and with the help of a friend, he constructed a Crystal Set. The broadcast stations were experimental, stations such as 3AR (built and operated by Associated Radio), 3UZ (under the Oliver J Nilsen banner), and 3NS (owned by Norrison Scalley). The latter two were owned by businesses pertinent to the electrical engineering field.

These stations operated for a few hours each day and, at the time, amateurs were allowed to operate and broadcast music on the broadcast band. The receivers, abundant around Melbourne, were complimented by two oregon masts around eight to nine metres high, and orientated to receive as much energy as possible from the antenna strung between them.

Percy graduated very quickly from the crystal set to a one valver, using a UV199 (my first set was a 1D8GT and I still have vivid memories of getting it to receive 3AH), it was a dull emitter type valve different to the Philips type-E valves of the day, which lit up like neon signs. To control the volume, a rheostat was placed in the filament line in early valve sets.

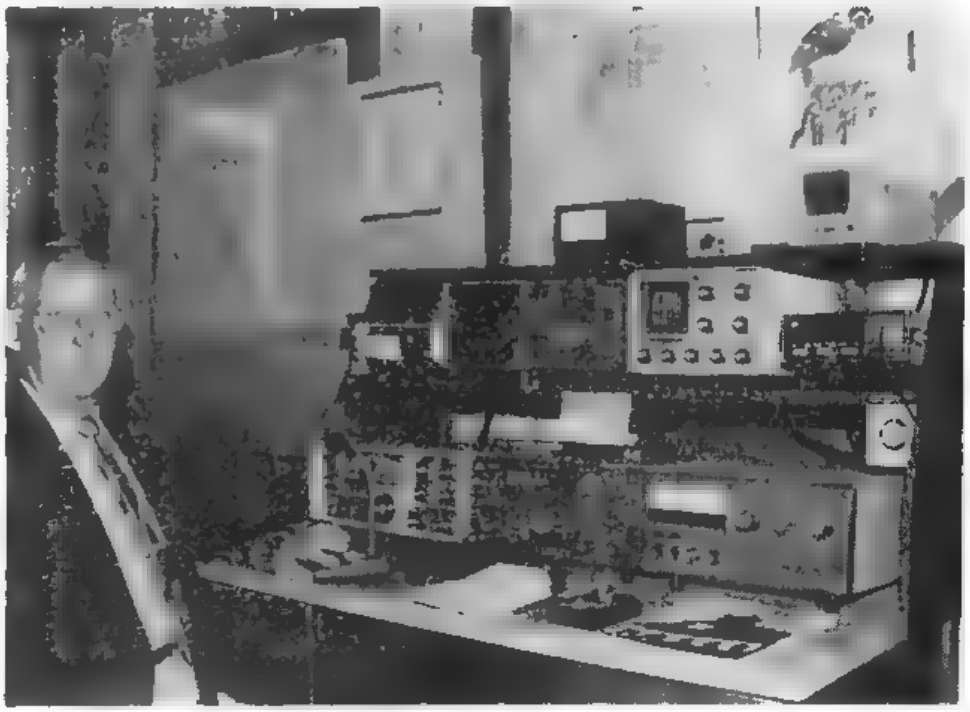
Later sets, like the Neutrodyne, had two triode RF stages which had to be neutralised and the coils were unshielded. The power supply was a 60 volt dry B-battery and the bias was supplied by a 4.5 volt battery tapped at 1.5 volts. A commercial company, Philips, produced an eliminator which provided all the voltages required. Quite a godsend and easier on the expenditure, however the filament voltage was still derived from accumulators.

Around 1927, Percy became an avid SWLer and built many receivers using "honeycomb" coils which were constructed by wire being wound around nails placed into board. The heads were cut off after winding and the coil was placed on ebonite strips. The coils were so arranged that the



The broadcast transmitter that gave excellent service over a long period of time. It was used with a homemade Reiss carbon microphone and the twin spring-wound turntables are shown in the foreground.

The shack prior to 1935. The transmitter is the foreground used four UX281 rectifiers for the PA and modulator, located at the bottom of the rack. Centre was a crystal oscillator and buffer amplifier. The top section housed the UX210 finals and metering.



Percy VK3PA, the Voice of Wallington, in his shack of modern times.

proximity could be altered to suit conditions as were the oscillator coils to produce the correct frequency. Rather crude by todays methods but effective at the time.

Percy upgraded to transmission, with his first set being a UX210 tube. The UX210 cost £2 15.0, a considerable amount of money in those days. The HT and LT transformers were homemade on a lathe, the rectifiers were 'S' tube cold cathode gaseous types, which were rather impracticable due to voltage regulation, and were eventually replaced by two UX281 rectifiers.

Two Tuned Grid Tuned Plate (TGTP) transmitters were built, one for 28 MHz, the other for 14 and 7 MHz, low voltage supplies being switched by a DPDT switch. The antenna was a full wave 20 metre Zepp with tuned feeders. During 1929, some interesting 10 metre openings to New Zealand, Japan and the USA were utilised. Percy had his share of problems during this period as a considerable amount of his equipment was stolen. (It happened in those days too, regrettably. . 3AH). This was a setback to him as he missed out on the rare DX of those days.

The arrival of indirectly heated screen grid valves, giving greater amplification without going into oscillation, was an immense step forward in the hobby, complimented by the advent of the metal chassis and front panel. This assisted in many problems which were associated with "hand" capacity being eliminated and considerable headaches being solved in the constructional area.

In 1931, Percy built a five metre Colpitts transmitter with a halfwave dipole as the radiator. The feedline was electric light cord, similar to figure-eight we know today. Losses must have been very high, however it worked and at that time, to the best of our knowledge, worked efficiently!

In the *Listener In* May 10, 1931, the late Max Howden VK3BQ, wrote that VK3TA had his five metre receiver going, (they also had typos then too. 3AH), and we can start the five metre "ball" going.

About this time, Percy built a transmitter for the broadcast band using a crystal oscillator and a buffer state driving a pair of UX210s. The modulator used a pair of UX210s in class B. Earlier this was written up in *QST* giving full details of transformer windings and associated data.

Many of the commercial stations of the era showed much interest in Percy's "perfect modulation' the first in this country which was of broadcast quality, according the another amateur of that time, Arthur VK3UX. Arthur states that Percy had a wide listening audience each Sunday morning.

Percy remembers vividly the use of 30 and 40 metres using the cross-band facility when USA contacts were frequent. Eventually the 30 metre band was lost to VKs and 40 metres became the norm.

The next major step forward was the superheterodyne receiver, the volume being altered by the cathode bias applied to the mixer and IF strip. Later AGC was introduced.

Many antennas were tried on the bands — two halfwaves in phase and vertical types were some of the more popular. Percy states, "it must be understood that all equipment was mainly home-brew due to the availability of parts and economics."

Just before the outbreak of WWII, the authorities sent urgent telegrams to all licensees that they were to cease transmissions, dismantle their equipment and forward it to a secure area where it would be stored. At the cessation of hostilities in 1945 it was the amateurs responsibility to arrange transport at his or her expense to have the equipment returned.

In early 1940, Percy passed a trade test in transmitting and receiving Morse at not less than 20 WPM, and an examination in radio and engineering theory. After passing he was placed on the RAAF Reserve until July 1940. He was then called-up and posted to Point Cook Radio School, sent to Number 2 Squadron, onto the instruction staff at Number 2 WAGs and thence to Number 3 Instructional Staff with the duty of being in charge of maintenance. Valuable equipment en route to Australia was lost at sea due to enemy action and Percy's experience as an amateur and professional was used to the fullest.

He was endowed with the task of building two CW transmitters using available parts, and chose to use VT25 triodes (familiar to the amateur service). Sockets had to be fabricated and power supplies obtained. Luck was with him as he obtained four 425 volts a side transformers at about 150 milliamps rating. For each power supply using a UX280 rectifier, two were connected in series with electrolytics which gave a nominal 900 volts DC output, were constructed and pressed into service for two transmitters. This equipment, with series Hartley oscillators performed magnificently until replaced by commercially made equipment.

The RAN also was assisted during Percy's time in the forces when a Corvette, with a full crew aboard, was unable to commence proving trials until assistance was given by this ingenious technician. He had them on air the same day — no mean effort!

Percy comments, ". . .most of the amateurs of the day were either in the three armed forces or on reserve as it was essential that trained personnel were available to improvise as only amateurs can do in the wartime situation that they were faced with."

He was posted to the Fighter Squadron at Merauke, in Dutch New Guinea, where equipment had to be tested under high temperature and humidity. This is where one discovered what worked and what didn't in such unpleasant conditions.

Posted back to Townsville before spending time at Moratai, where Percy remembers the station WVTL, operated by the US armed forces on the MF band. This was heard on a converted RA8 with a tuner for shortwave transmission stations and other frequencies. One BBC station would be okay until sunrise when, with a couple of deep fades, it would disappear. One would then change frequency and listen to shortwave from New Delhi. The sporting results from Australia were eagerly sought by the troops.

Returning to Australia in early 1945 as a "walking patient", Percy had a short stay in the Heidelberg Repatriation Hospital until being discharged in October 1945. His duty to his country as a serviceman was completed with exemplary conduct.

In December 1945, VK3PA joined the staff of the National Broadcasting Corporation, Radio 3AR and 3LO, where he qualified as a technician and later a senior technician — radio and broadcasting. He was promoted to Officer in Charge of the Western Regional Area in 1964 and was based at 3WV, located at Dooen, 10 km north of Horsham.

During late December 1945, amateurs were allowed to participate in their hobby again. Percy constructed a four crystal controlled transmitter. The crystals were ground to amateur frequencies from available disposal source crystals that were switched. The number of amateurs populating the bands necessitated the building of a VFO which was fed into the cathode of the oscillator stage in lieu of the crystal. This transmitter on the frequencies of 7, 14 and 28 MHz was in service until 1964, with associate receiver and antennas. The advent of SSB necessitated another transmitter being constructed and this was in service until 1968. Until this time all of Percy's equipment was 100 percent home-brew.

In 1968, Percy bought his first commercial equipment, a transmitter/receiver and beam antenna. This equipment has been upgraded gradually over the years. Percy has constructed a few items from kits, but still yearns for the DIY days (do-it-yourself). He notes that he was a keen CW exponent with a hand key but has become lazy over the years. His comments on hand and bug keys are worth noting — with the hand key one could recognise the operators by their fist, however some of the latter sound excellent in the right hands but with an inexperienced and sloppy operator they are terrible and virtually unintelligible. Incidentally, Austine VK3YL, a keen exponent of Morse still uses a hand key and her sending is impeccable.

Percy says that some of the modern modes such as SSTV, RTTY, VHF, UHF, Moonbounce and others are an adjunct to the hobby never thought possible in the pioneering days. He is very critical of speech compression and speech tailoring, which cause distortion and splatter if not used correctly.

The DX scene has changed dramatically, the DX orientated are always on the lookout for a new country and when a rare country comes on the air the call sign is not given frequently and one has to be very patient to hear the correct call and sometimes QSL information.

Percy has many recollections of the early days of our hobby, including a vast knowledge of early vacuum tubes, including the first "peanut" valves and the valve that Telefunken brought out with at least two filaments — when one burnt out you switched or connected the next! Economy-plus when one thinks of the ingenuity.

Thank you Percy for your insight to the early days of radio, the history of yourself and your thoughts on the hobby to commence 1987, hopefully the year when the solar cycle starts to improve and gives many new DX contacts and countries to the waiting mass. It is hoped this will give many more stations the incentive to call you and discuss old times, as to my knowledge this is the first time your experiences have been published. I am sure it will trigger off many items of interest to other amateurs including newcomers to the hobby.

On behalf of readers of this column we trust you enjoy many more hours of operating the nets you so competently MC and rag-chew with your friends. All DXers appreciate your contribution to the hobby. Percy has also intimated he has a couple of technical tips for *Amateur Radio* and we look forward to reading them in due course.

The start of the New Year and a hope that the Solar Cycle will improve. We, as DXers, can only trust conditions will improve, as with other items concerning our hobby, such as the resolving of the ARRL DXCC controversy, whether new countries will be allowed for credit and how many will be deleted.

MORE ROOM ON 40 METRES

Radio Beijing has not suffered "jamming" since October 12, with its Russian Broadcast on 40 metres and other bands. Hence more room for DXing on this quite interesting band. Of course, if this and other 'BC' removed themselves there would be lots of room for everyone.

The West German World Radio Service *Deutsche Welle* says there has been a noticeable increase in Soviet-bloc interference of its own and other western transmissions to the Soviet Union, Bulgaria, Czechoslovakia and Afghanistan. At the same time, jamming of Radio Beijing, the Albania service and Radio Tirana has ceased.

The Technical Director of Deutsche Welle, Guenter Roessler, says the Soviets spend millions of dollars each year to operate an estimated 3000 jamming stations, use mainly against shortwave broadcasters.

Who would like to estimate the power used to generate the unknown number of kilowatts that flood the bands?

ET JUPAT — HG4SEA

The two Hungarian *Round the World* sailors (see August 1986 AR), left Sydney Harbour on November 15, in their 11.5 metre, four tonne vessel, bound for Auckland, intending to arrive on the first of last month, where they intended to stay about four weeks.

Then commences the perilous journey from Auckland to Buenos Aires in Argentina, non-stop, across the Southern Pacific in an easterly direction, rounding the notorious Cape Horn, where the waves can reach up to 10 metres in height. A stop-over before they continue to their home port of Opatija in Yugoslavia sometime in 1988.

The amateurs that were assisting in the Tasman crossing were VK2s BNR, OG, PS and ZL1s MA and [illegible].

A note from Lajos HA5DW, states that the band conditions will be poor on the long crossing and information gleaned from any source would be greatly appreciated in the seafarers homeland.

MORE US AMATEURS

An increase of 20 979 new licensees were listed in the fiscal year, October 1985 to September 1986, as against 17 373 in the previous period. This brings the total for all grades to 421 082 licensees in America.

WORLD-WIDE BEACONS

There are presently nine beacons on 14.100 MHz that operate around-the-clock. The beacons are located at:

TIME	STATION	LOCATION
00	4U1UN/B	New York
01	W6WX/B	California
02	KH6O/B	Honolulu
03	JA2IGY/B	Japan
04	4X6TU/B	Israel
05	OH2B	Finland
06	CT3B	Madeira Island
07	ZS6DN/B	South Africa
08	LU4AA	Buenos Aires

The beacons are crystal controlled and the same sequence recommences at 10 minute intervals with the following text transmitted by each beacon:

POWER LEVEL	CW MESSAGE
100 W	QST de (stations call sign) bea-
100 W	● -9 second dash-
10 W	● ● -9 second dash-
1 W	● ● ● -9 second dash-
0.1 W	● ● ● ● -9 second dash-
100 W	SK (stations call sign)

Transmission time: ±58 seconds.
Speed: 20+ words per minute.
Power attenuated in 10 dB steps.

Have a listen and find out where the bands are open to. You will be amazed at the low power signals that can be heard when propagation is even fair.

BITS AND PIECES

The United States has signed a Third Party Agreement with Sierra Leone for communications by amateur radio of a technical or personal nature. As always, business communications are prohibited. ** **Graham G4KLP** was QRV from Amman using the call **JY8KL**. QSL to the home call. ** **Reg JW7FD** is now back home after his tour of duty. ** **Bob KD7P** has given up on operating Peter 1 Island after much time spent trying to obtain the documentation. Next year may be a different story or a far different location. ** All cards for **FO0XX** that were accompanied by IRCs or "stamps" were mailed by September 25, last year. ** **KA2CC** is now QRT from Minami Torishima. ** **Kimsan XU1SS** is quite active and QSLs go to JA1HOG. ** The USSR Arctic Net, ably MCed by **UA1IMU** meets at 1300 UTC on Sundays. ** Do not overlook 15 and 10 metres for some good openings. One has to monitor these bands at various times as they are very unpredictable. ** Do not forget the Antarctic stations, generally below 14.170 MHz, who like to chat back-home when duties permit.

CW SWLing WITH ERIC L30042/VK5

It is pleasing to welcome Eric back to the fold as he continues recuperating.

1.8 MHz
VK2BHO; VK2HC; VK3BEE; VK3CGG; VK3OI; VK2RS/3; VK5ADX; VK5BC; VK7BC; W6FX.

3.5 MHz
JA4ESR; VK4KGR; VK7EDZ.

7 MHz
FK25FS; I4EAT; KP2J; VK9XI; VU2TEC; N1EA/MM.

10 MHz
JA2KXL; F3NB; UA9MD; W2NS.

14 MHz
DL3GK; FK8EJ; VK8FN; VK0AV; HA5SO; VK8OI; HL4GAE; HK3YH; LZ2EV; OK3KII; YU1KQ; YB4FN; VK0SRT; 4X6MP.

21 MHz
A25KM; BV2DA; KK7K/DU2; HL2AZJ; UC2ADX; UJ8JCC; VE7NH; VS6DT; YB1DVW; VK2BNJ; VK3ON; YC4BRX; YC0KKI; 7J1ACH.

28 MHz
JA2OLJ; JE2YHS; JR8APW; VK4NCC; VK4NJO; VK4XA; VK5WI (beacon).

THANKS

Sincere thanks to the Editors of weekly, bi-weekly and monthly publications such as: *ARRL Newsletter; BARG; CQ-QSO; The DX Family Foundation Newsletter; Inside DX; The W6QO/KH6HD QSL Manager List KH6BZF Reports; Long Island DX Bulletin; Papakura Radio Club Bulletin; QRZ DX; RSGB DX News and the Westlakes Amateur Radio Club Newsletter.*

Magazines including *Break In; cqDX; DX Post; JA CQ; JARL News; KARL News; QST; Police Life; RadCom; Veron; Weather News* and *Worldradio*, to mention but a few.

Individual contributors this month include HA4DW; VKs 2PS, 3PA, PC, YJ, YL, 8NE, L30042/VK5; ZL1s AMN and AMM. Thanks to one and all.

—73, Ken VK5AH

The Ham Bands . . . by Beat Note

We were slouched in front of the receiver, stripped to the waist. Beyond our open window, trees were etched into the intense radiance of this sweltering afternoon. Only the infra-throb of the sun broke the silence of a world heat-drugged into a death-like slumber. Moo-Moo, the feline, lay on its back, with feet in mid-air, to lazy to stalk the fly dozing on the wall.

We knocked the receiver onto 20 and listened abstractly to a scattering of twos and nines yawning at each other. The air was dead. We dozed a bit.

Dusk rolled in like a damp cloudbank. A bird took wing for its nest; a few leaves fluttered; Moo-Moo stretched, and the fly drew itself up to the ceiling. Twenty rolled over and murmured. The drone of heterodynes issued from the mud. Gs, LUs and VPs were stirring in the slowly gathering froth of QRM. The nines were commencing to bust up the east coast. The world was rubbing its eyes after a deep siesta.

When the curtain of darkness fell, the heat gave to the evening that queer magic of the tropics that quickens the senses. Anything could happen, we told ourself — anything within reason or without reason. Even a VU could break through the ever-increasing growl of 20, and it was with this absurd thought in mind that we threw the lever on the automatic electrical bank spreader and plastered 20 over 300 degrees.

We took a 5 kc slice off the low end and picked out a few insignificant CW boys a mere 4000 miles out, and an SU on phone. While running over a YN birdie we heard what could have been an audio image, but excessively sharp. A mere touch on the vernier crank gave little more than an indication of the presence of some form of carrier. We increased the spread to 1000 degrees, and after careful retuning were rewarded with a constant unmodulated carrier beating with the double low-frequency oscillator.

We tried audio-frequency heterodyning without success, and finally resorted to doubling the 1000-degree spread through a harmonic amplifier. It was immediately evident upon tuning back into the carrier that, what had at first seemed to have been a single wave was, in truth, a multiple affair. Excitedly we threw in a five-stage push-pull preselector equipped with an inverse silencer and shot balancer, and upon applying a negative resistance to the super-regenerative AVC amplifier, learned to our complete surprise that, not only was each carrier being modulated but, more surprising still, each was without a doubt the carrier of an amateur phone station. There was no mistaking the crystal clear amateur idioms.

But what modulation! Never had we heard such dulcet tones, such succulent sibilants, such breathless bass response . . . and this, mind you, with nary a trace of interference!

With trembling fingers we moved the micrometer adjustment on the split- frequency control and brought the nearest carrier into zero beat with the double low-frequency oscillator. Then, de-energising the beat oscillator, we sat with bated breath awaiting the sign-off. It was not long in coming, but the shock we received left us completely unstrung. . . could it have been possible? — but yes, we had heard it as clearly as our own laboured breathing — CO13CZ signing with W12AMI.

With a madness born of an indescribable fear of the unknown, we rocked from one station to another. . . ZB-F2, CY27-F1, XL44-F . . . Cold sweat trickled down our back. We wanted to smash our receiver into bits to escape from this nightmare, *because we know by a chance remark about the war of 1950 that we were listening in on the future!*

Stark, shrieking fear is a mental enema that often leaves the brain in a transcendent stage, and this is undoubtedly the effect it had on our intellect, for with surprising rapidity for one as slothful as ourself, we grasped the immense truth underlying the mode and manner of these future communications. It came as a flash that a sub-harmonic of the third multiple frequency would undoubtedly do the trick. With surprising calm we hooked in an absorption trap and used the output to excite a single-ended doubler. We switched in the transmitter and cautiously called W11SM-F2 whom we had previously heard. We confess to a bit of excitement when we flipped the standby switch on the receiver and kicked up the inter-mediate RF gain. As the distant carrier came on, the shot noise balanced out and we heard the clear voice of W11SM-F2 coming back.

"I believe this is out first QSO," he said.

We commenced working duplex, and we said, "It most certainly is, if it is a QSO at all, because I am a fighter and I suspect I will have been killed in the war of 1950 and so, if I am dead, how can I talk to you?"

"You are talking nonsense," he shot back. "Don't you know your FCC regulations regarding coyness in the amateur bands? Coyness has no place in the amateur bands, nor poor modulation for that matter. Yours is terrible. And, by the way, what is your complete assignment? You made no reference to your frequency area, and I am beginning to doubt that you are licensed to operate in region F2. Putting everything together, there is something decidedly queer about your mode of operation."

"There ought to be," I replied. "You may be surprised to learn that I am working from the year [illegible]."

"By Harry!" he exclaimed. "so your year finally broke through. Let's see, now — QRX just a second — yes, you're working your frequency against the 27th multiple of the terrestrial cycle which clearly places you in the year 1936. Well, congratulations, old man — we talk to lots of the boys in the 1937 to 1949 period, but you're the first '36 to get through. There will be no end of excitement when the ARRL hears of this and, by the Lord Harry, it means I will get the first WAY Certificate ever issued."

"What," I asked, "is a WAY Certificate?"

"Worked All Years, of course," he shot back. "You see, due to the lunar variation, no signals previous to the year 1936 can be received; they fall into a complete Dellinger Fadeout. Besides, the earlier years are the more difficult catches, just like the distant stations in your time cycle, so you can see that you're a rare catch for any amateur."

"Well, arc my tank condenser, if that isn't the damnedest," I said. "Imagine hunting for years instead of DX. Here in New York we consider ourselves pretty good if we can hook a VU, but wow, hooking the years is a new stunt in this game."

W11SM-F2 laughed. "My father was an amateur before me, and I recall his speaking of VUs. If I am correct, that was — or is, I should say, the territory known in your time as India. Incidentally, old timer, it may interest you to know that I am a distant descendant of yours. I've just checked you in a '36 call file and find that my great-great-great- grandfather is none other than yourself."

"The hell you say," I gasped. "It's incredible. Why, son, you're not even born yet, and still — well, it's beyond me. I'd rather we changed the subject. Tell me, what district is W11 . . . we don't have any such area in '36."

His carrier dropped into a slow fade. "Hold it," I shouted, "you're dropping out of the picture."

He came back about an R7. "Sorry," he said, "we're falling out of synchronism with the time cycle. I'll be out completely in another minute if I can't hold the beat. We'd better sign now while it's still a 100 percent QSO."

Slowly his signals were reaching the shot noise level. I kicked the gain a bit and said, "Okay, son, glad to have met one of my future offspring. Tell your mother I'm going to fight in the war of 1950 to keep up the family traditions . . . and where did you say W11 was?"

I had to put on the cans to get him at all on the comeback, he was so weak, but I squeezed h m through. I heard him say very plainly, "Mother is here and says she knows all about you. During the battle of San Antonio you dropped five enemy planes and picked up as many medals. She has them in front of her now! W11 old man? Why W11 is the US possession on Mars. Well, cheerio and happy landings. W11SM-F2 signing off and clear and pulling the switches."

We awoke with a start. The light was on and Moo-Moo had just scrambled off our lap in hot pursuit of the fly which, we learned from our better half, had landed on our nose.

—The original of this fictional article appeared in *All Wave Radio* just over 50 years ago. August 1936, and was contributed to *Amateur Radio* by Alan Cook VK3AUC.

er

SPUDOS AMIGOS

Just a line to say I'm living, that I'm not among the dead,
Though I'm getting more forgetful and more mixed up in the head,
For sometimes I can't remember when I stand at foot of stair,
If I must go up for something, or I've just come down from there.

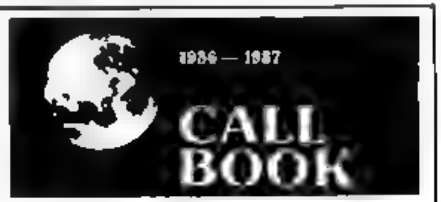
I stand before the fridge so often, my poor mind is filled with doubt,
Have I just put food away, or have I come to take some out,
And there's times when it is dark out with my night cap on my head,
I don't know if I'm retiring, or just getting out of [bed].

So if it's my turn to write you, there's no need in getting sore,
I may think that I have written, and don't want to be a bore,
So remember I do love you and wish that you were here,
But now it's nearly mail-time, I must say good bye dear.

POSTSCRIPT

There I stood beside the mail box, with a face so very red,
In lieu of mailing you my letter, I opened it instead.

Contributed by Bill VK3CFL, via Bruce Bathols VK3UV



Have you noticed any errors or omissions in the 1986/87 Call Book?

Please advise the WIA of any corrections as work has commenced on the 1987/88 edition.

Write to: PO Box 300, Caulfield South, Vic 3162.

Please enclose information as in Call Book and corrected information!

VHF UHF — an expanding world

Eric Jamieson VK5LP
1 Quinns Road, Forreston, SA. 5233

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50.010	JA2IGY	*Mie*
50.060	KH6EQI	*Honolulu*
50.075	VS6SIX	*Hong Kong*
50.109	JD1YAA	*Minami Tori-shima*
52.013	P29BPL	*Lokoata Island*
52 020	FK8AB	*Noumea*
52.100	ZK2SIX	*Niue*
52.150	VK0SJ	*Macquarie Island (Keyer)*
52.200	VK8VF	*Darwin*
52.250	ZL2VHM	*Manawatu*
52 310	ZL3MHF	*Hornby*
52 320	VK6RTT	*Wickham*
52 325	VK2RHV	*Newcastle*
52 350	VK6RTU	*Kalgoorlie*
52 370	VK7RST	*Hobart*
52 420	VK2RSY	*Sydney*
52.425	VK2RGB	*Gunnedah*
52.440	VK4RTL	*Townsville*
52 450	VK8VF	*Mount Lofty*
52.460	VK6RPH	*Perth*
[illegible]	VK6RTW	*Albany*
52.470	VK7RNT	*Launceston*
52 485	VK8RAS	*Alice Springs*
144 019	VK6RBS	*Busselton*
144 400	VK4RBB	*Mount Mowbullan*
144 410	VK1RCC	*Canberra*
144 420	VK2RSY	*Sydney*
144.430	VK3RTG	*Glen Waverley*
144 485	VK6RTW	*Albany*
144 480	VK8VF	*Darwin*
144 485	VK8RAS	*Alice Springs*
144 550	VK5RSE	*Mount Gambier*
144 565	VK8RPB	*Port Hedland*
144 600	VK6RTT	*Wickham*
144.600	VK8VF	*Mount Lofty*
144 950	VK2RCW	*Sydney*
145.000	VK6RPH	*Perth*
432 057	VK6RBS	*Busselton*
432 160	VK6RPR	*Nedlands*
432.410	VK6RTT	*Wickham*
432.420	VK2RSY	*Sydney*
432.440	VK4RBB	*Brisbane*
432 450	VK3RAI	*MacLeod, Melbourne*
432 535	VK3RMB	*Mount Buninyong*
432 540	VK4RAR	*Rockhampton*
1296 171	VK6RBS	*Busselton*
[illegible]	VK2RSY	*Sydney*
1296 480	VK8RPR	*Nedlands*
10300 000	VK6RVF	*Roleystone*

BAND CONDITIONS

Six metres is beginning to liven up and occasional contacts are occurring mostly between VK5 and VK2 and VK4. Signals to S9 of course, and one constant customer is Lyn VK4ALM. As we have now entered November (at time of writing) one could expect activity and openings to considerably increase very soon.

On the two metre scene, I am still at some disadvantage due to the antenna rotator being locked in a south-easterly direction. The weather has not been hot enough yet to soften the grease up-top, so little to report other than fairly constant reception of the Mount Gambier Beacon, VK5RSE, in and out of the noise most times.

EME CONTACTS

Doug VK3UM, continues to keep the flag flying and had considerable success during the recent contest weekend of 25/10 and 26/10. After the big flame-out of the 4CX250B amplifier, help flowed in from a number of amateurs enabling Doug to test and select suitable tubes to put the amplifier on the air again. Just to make sure everything was in order for the contest, Doug fired up the day before (24/10) and at 2020 worked YU1AW at 549 sent and received.

On 25/10, the following were worked: 1625 NC1I 439 sent 449 received; 1645 N4GJV 439 439; 1701 K1FO 549 539; 1715 JA1JRK 439 439 (probably using a dish); 1725 W0RRY 439 439; 1730-1742 a mass of signals and difficult to sort out; 1755 K5AZU 559 449; 2118 OH2DG 0 339 (dish); 2143 SM4IVE 429 439; 2152 YU1AW 439 439 (dish); 2218 DF3RU 449 439; 2225 OH2TI 439 439 (dish); 2243 DL9KR 439 439.

On 26/10: 1700 KD8R 449 449; 1750 JA4BLC 0 339 (perhaps 0); 1800-1835 a pile of weak stations, 1835 JA6CZD 559 549; 2150 SM3AKW 0 0; 2309 ZL2AQE 0 0.

Some observations made by Doug were that conditions were excellent to the USA with optimum Faraday rotation, signals were poor to Japan while signals from Europe appeared to be cross-polarised. Moon-set was 2350 on 26/10 (UTC Monday) so only a short time for the window to Europe. Overall he had more contacts than last year, but worked less countries. He noted K2UYH was missing.

Doug VK3UM, also advises he has set up a program suitable for those equipped for EME in *Pascal* and giving calculations for the sun, moon and sky noise. There are 113 locations stored on software for the IBM. Send a disc to Doug if you would like a copy.

Of interest also is that David VK3AUU, from his new location, worked W5UN on two metres at moon-rise on 24/10. Good work David.

IC-551 NOISE BLANKER

In the November 1986 issue of AR I gave some further hints which came from David VK3ADM, on how to set up the modifications to the IC- 551 noise blanker, and promised to let you know what happened when I completed the modifications.

The job has been done, except that I used a 2N2222A instead of the 2N2222, but I could not see that this would matter. I found doing that actual modification quite straight forward, but was unable to check results before modification as power leak was absent at the time. However, after completing the job I got out the power drill and wrapped a couple of turns of hook-up wire around it and led the wire into the antenna terminal as advised. The drill certainly kicked up a racket, but the noise from it was fluctuating. After a while, it settled down and by adjusting L19 and R65, I reduced the noise from S9 with the blanker off to S2-3 with the blanker on, which seemed satisfactory in view of the comments by VK3ADM. Still no power leak when I had finished!

Two days later, when the power leak was S9+, I switched on the noise blanker and the S-meter dropped to zero. At the moment, the modifications appear most satisfactory and can be recommended. I will wait for final proof when summer arrives and the noise can be S9 +40 dB, if I can silence that it will be a dream come true!

One thing I did notice was that under conditions of high noise with the blanker on I could hear some backchat from the very strong signal of the local beacon for about 30 kHz on the low side of the beacon. If the noise was absent the beacon was its normal narrow self, whether the blanker was on or off, so some cross-modulating must be occurring under conditions of extreme noise. Just what effect this will have when the band is well-stocked with stations I cannot say at the moment because when stations have been there lately the noise has not! More on this later.

AUSTRALIAN VHF/UHF/SHF RECORDS

The 1986/87 Australian Amateur Call Book has an updated listing of distance records for the various bands. Since not everyone has such a call book and as the distances will be of interest to overseas readers, the following are the Australian record-holders.

BAND MHz	CALL SIGNS	DATE	KM
50	VK3OT — VP2VGR	17/03/81	16563
144	VK4ZSH/4 — JA7OXL	24/04/83	6617
432	VK3ZBJ — VK6KZ/6	23/01/80	2716
576	VK4ZRF/4 - VK4ZSH/4	07/12/81	378
1296	VK5MC — VK6KZ/6	23/01/80	2289
2300	VK5QR — VK6WG	17/02/78	1885
3300	VK3KAJ/3 — VK3ZBJ	25/01/86	246
5650	VK2AHC/2 — VK2SB /2ZND/2	12/04/75	114
10000	VK3KAJ/3 — VK3ZBJ/3	08/02/86	252
EME RECORDS			
144	VK3ATN — K2MWA/2	26/11/86	16761
432	VK6ZT K2UYH	29/01/83	16726
1296	VK3AKC — W2NFA	06/10/73	16713
ATV RECORD			
432	VK7EM/T — VK3ZPA/T	13/12/72	413

FROM CANBERRA

I was pleased to receive a letter from Graham VK8GB/1, who now resides in Canberra in which he advises of some six metre openings to VK3 and VK5, of recent times in the evenings and an opening to JA and VK4 on 26.10 during the afternoon. Stations in Sydney have reported working ZL, VK3, 4, 5, and 7.

Graham has antennas set up for six, two and 70 cm, but suffers, as do most South Canberra residents, with local terrain losses due to the close proximity of hills and mountains. (I know the feeling . 5LP) Tropo path losses to Sydney and Melbourne are increased by about 15 to 20 dB. The direction to Adelaide has much the same losses. Despite the losses, most Canberra stations can hear the VK2RSY beacons on six, two and 70 cm most of the time. Graham is able to hear them weakly with occasional peaks due to aircraft enhancement.

Local activity has been fairly limited during winter. On six metres, stations heard include VK1VP and VK1ZDX, VK2AKU (Tumut) and VK2ZRE (Adaminaby). On two metres, the regulars are VK1BG, VK1RK, VK1VP, VK2AKU and VK2ZRE. On 70 cm VK1BG, VK1BUC and VK1VP.

Most activity is centred around aircraft enhancement tests to Melbourne on Saturday and Sunday mornings with VK1BG having outstanding results. Eddie VK1VP is limited by the proximity of Black Mountain, while those in the south are limited by path geometry.

David VK3AUU, runs a signal regularly on 144.1 in the evenings at 2030 (local) and is nearly always readable on CW and often works VK1RK and VK1BG. Graham also confirms the earlier mention in these notes about David VK3AUU working W5UN by EME.

THE ROSS HULL CONTEST — AGAIN!

My copy of AR for November has just arrived and I note that changes to the Ross Hull Contest, which are largely in line with some recommendations I was able to make as the result of some correspondence I received earlier in the year. The major change is the use of three bands, 52, 144 and 432 MHz only, which should now bring the contest within the working parameters of more stations with chances to compete for the certificates being awarded. The scoring table is simpler than in most previous years and does give some incentive to work distant stations.

I do not propose to make any more comment in this issue on this year's rules, there will be time for that after the contest is over and the flak has settled. However, whatever your views, ***please send in a log, if for no other reason than to keep the contest alive for the moment!***

Throughout the year, I have been asking for feedback on the contest but only a handful of people have been prepared to place pen to paper despite dozens of on-air grumbles I heard last year. Most letters contained worthwhile suggestions and where possible, these have been acted upon. Surely there must be more people out there with good suggestions who do not bother to write. With the arrival of January 5 the contest will be behind you. After you have prepared your log and posted it to the FCM, why not write me a letter and

give your thoughts in a constructive way. Anyone can knock a contest, it takes more to be constructive, so please say something!

One person who has finally written to me is Graham Baker VK8GB/1 who makes a few interesting proposals for me to consider and then to pass on to the appropriate authority. That authority for the moment should be you, the readers! He says. "The basic objections to the current rules can be summarised as follows

1 IT IS TOO LONG — For many it is not possible to be continuously active for a period of several weeks. Because of the sporadic nature of the openings to have a real chance of winning, you need to be there all the time. The majority of people can only operate after work and at weekends.

I propose the contest to limited to a period when most people are on holidays during a good prospective propagation period which would be 0000 UTC December 26, to 0000 UTC January 2, each year.

2 YOU DO NOT HAVE A REAL CHANCE OF WINNING — At the moment there are only two awards given, one for the best seven day score and the other for the best one day score. If the awards were based on a State or call area basis, the opportunity for success would be greater and you would be competing on a more equal basis. A greater sense of competition would result and the problem of how to deal with the people in the west would be overcome.

I suggest a certificate award for the best seven day score and one day score for each call area. In addition, one overall winner for the best seven days score in Australia could be awarded the existing Ross Hull Trophy. (The 1986 rules do provide for State awards for seven days and the trophy to the top Australian score. see page 40 Column 3 November 1986 AR . .5LP).

3 YOU HAVE TO OPERATE ON ALL BANDS TO WIN — The current rules make use of as many bands as possible obligatory to success. Many people are well equipped on one or two bands and on the basis of the above mentioned premise that people must stand a chance of winning, I suggest that the certificate awards be made on a band basis as well. This would mean awards for the best seven and one day performance on six, two, 70 cm and UHF for each State.

To establish an Australian winner on each band would be an advantage and I suggest that the best seven day score for each band in Australia have the certificate marked *Winner for Australia and VK#*, thus no extra certificate would be required, but the prestige would be there.

4 THE METHOD OF SCORING IS NOT FAIR — The method of scoring in the past has been based on a rather complicated arrangement which purports to award points on the basis of perceived contact difficulty.

I suggest a simplified method of scoring would be more appropriate and to give the contest a new lease of life I suggest the adoption of a *Maidenhead Grid Square* system of multipliers. Each contact would be worth one point and the exchange would be signal report and Maidenhead number.

To simplify matters when working overseas stations, multipliers for call areas could be used with only signal report exchanges required.

For New Zealand it may be possible to incorporate them into the contest for award purposes and they could then also be included in the Maidenhead multiplier system.

For multi-band operators, band multipliers would apply as at present, but this would be only applicable to those stations seeking the Ross Hull Trophy. A summation of daily scores is suggested as distinct from a total seven day multipliers basis. This would assist those stations operating in the one day category by having more stations available to work.

5 NO ADVANTAGE FOR PORTABLE OPERATION — To encourage activity from rare grid squares, an award for portable operation could be considered. I have some reservations as to it's necessity, as such a station may be positioned to take into account advantageous geographical locations and may be in considerable demand.

6 ADDITIONAL NON-CONTEST AWARDS — To take into account a greater awareness of grid squares it may be opportune to institute a grid square certificate similar to the system in the USA.

I hope these thought may be of some use in revitalising interest in the Ross Hull Contest."

The only comment I want to make on all these matters at the moment is, in the area of signal report exchanges. To give a signal strength report followed by your grid square number may be alright for the first contact which would require the readability to be good enough to get all the details. But what about, say, having a weak two metre contact with very marginal conditions. All you would need would be to decipher the RS report and by looking in your log you could add the grid square number if you did not get it! I think such a system is open to possible abuse in some cases whereas the need to correctly identify five or six figures makes a certainty of the contact.

I would suggest you read the above suggestions along with those set out in the letter from Peter Gamble VK3YRP, on pps 60 and 61 of November 1986 AR. I already had an advance copy of Peter's letter and did not print it myself as I knew it was to appear in AR anyway.

BITS AND PIECES

The November issue of *The Propagator* carries an item under the EME Report by Lyle VK2ALU, that, on arriving at the site of their dish on 26.10 for the EME Contest, they found intruders had broken into the building yet again, items taken and operating cables ripped out, generally considerable damage being done.

One wonders at the mentality of people who do such things. Either they are spiteful because some people have something they have not or are simply anti-society anyway and must destroy the work of others, or there is a vendetta against the EME installation as such. It must be heartbreaking to discover such destruction — one can only hope further security measures can be undertaken.

On 31/10, at 0650 on Adelaide Repeater Ch 5, I had a contact with Mick VK2FBW/5, who was passing through on his way to Perth. Mick is actually W3ILG, and is a keen six metre operator. He has worked all 50 US States and about 43 countries. He runs two kilowatts to an 11 element Yagi on a 30 foot boom. His wife is WB3FUR.

A brief message came from Mark VK0AQ, which advised he was leaving in late- October for another stint at Mawson base in the Antarctic and would have six and two metre gear. He expects to actuate the six metre beacon again (VK0MA) and will be active on the satellites. David VK0CK, is also in the Antarctic at Davis base and will also be active on VHF. These two amateurs present two possibilities for Es contacts on six metres at least. I hope to be keeping contact with them on 20 metres as I did before and will report any happenings to readers.

VK0SJ, is at Macquarie Island, so there may be a possibility of a six metre contact from there. It is not possible to be too specific about what form of operating any of these people are able to undertake as they have to fit in with certain work schedules at their bases and when they are free these may not be the best VHF operating times. They often have to share radio facilities with others so it is not until they actually get themselves settled in at their locations and report back on HF that we have much knowledge of what they may be able to do.

Courtesy of Steve VK5AIM, I am being supplied with a very interesting series of articles by Ken Ellis G5KW, in *The Short Wave Magazine* from the UK. Part one deals with the reception of the Gibraltar beacon, ZB2VHF, on 50.035 MHz, operated by Jimmy Bruzon ZB2BL. Part two covers F2 propagation over the North Atlantic path from the Isles of Scilly, 1979 to 1981. Part three covers Transequatorial propagation (TEP) during sunspot cycles 18, 19, 20 and 21. Part four, which I have not received yet, is to cover 50 MHz during the International Geophysical Year, 1957-58.

CLOSURE

As these notes are being prepared not much more than two weeks after those for the previous issue, due to printing deadlines for the Christmas/New Year period, there has not been a very great supply of fresh information and, apart from the six metre band openings from time to time, not a lot to report. However, the next issue should contain a run-down on the Es season for December and it will be interesting to see if we have another bumper year on two metres!

Closing with two thoughts for the month. *Probably the best thing about the future is that it only comes one day at a time* and *A politician thinks of the next election, a statesman thinks of the next generation.*

Have a Happy New Year. 73 *The Voice in the Hills.*

QSP

COMPUTER-AGE ELECTRICITY METER

New technology may allow Australians to use off-peak electricity in the same way they can now save money with off-peak STD telephone calls.

The digital meter, a world first with a multi-million dollar export potential, would replace the electro-mechanical disc meters which have been used for the past 70 years.

It could be used as a direct replacement for existing meters or as a multiple meter to handle off-peak tariff metering.

The State Electricity Commission of Victoria (SECV) has been testing a multi-tariff system with a potential savings for consumers who shift their power use to off-peak times, weekends and public holidays.

Electric supply authorities could save millions of dollars a year in their power generation and transmission costs of smoothing electricity demand peaks.

Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW 2868

Having sung our *Auld Lang Synes* and celebrated the arrival of 1987 in the appropriate manner, perhaps we should take one last backward look at 1986 before it finally disappears from view, and see what we have achieved.

Our special 11th Birthday Activity Day was celebrated on Saturday, July 7, from 0400-1200 UTC. This proved to be such an enjoyable occasion that it has been decided to make it an annual event.

The ALARA Birthday Net on 80 metres was held on July 28, with quite a good roll-call, and several luncheons and get-togethers were held to mark ALARA's 11th year of operation, notably in VK5 and VK3.

Members of ALARA participated in many activities connected with amateur radio, such as WICEN, JOTA, CW Practice, etc and there were many individual outstanding achievements.

The WIA 75th Anniversary Medallion was presented to
Marilyn VK3DMS, Austine VK3YL, Joan VK3NLO, Barbara VK3BYK, Gwen VK3DYL (and family), Margaret VK4AOE, Jenny VK5ANW, Marlene VK5QO, Joy VK5YJ, Christine VK6ZLZ, Gill VK6YL, and Daphne Hugo.

Marlene VK5QO, received the Al Shawsmith Journalistic Award 1985, for her history of the VK5 Division of the WIA.

Jenny VK5ANW, became the first woman president of the South Australian Division of the WIA.

Helene VK7HD and Marilyn VK3DMS, were involved with the amateur radio section of the ABC program *Airwaves* broadcast early in the year.

Austine VK3YL, became a member of the WIA 50 Year Honour Roll with 56 years of membership to her credit, 55 of them as a licenced operator.

Mavis VK3KS and OM Ivor, became the first to attain the Jubilee of South Australia 150 Award on two-way CW. Mavis was also the first YL to receive the Award.

Maria VK5BMT, attained the Jubilee 150 Award on VHF.

Marilyn VK3DMS, became the first VK member of the Belgian Young Ladies' Club.

Phyllis W2CLB/7 gained third place in the phone section of the YLRL YL-OM Contest.

Bev VK6DE, Christine VK6ZLZ and Gill VK6YL, operated field station during the John Moyle Field Contest.

Maria VK5BMT, assisted with the operation of VK5JSA during the Australian Grand Prix in Adelaide.

It would appear that we have not let the grass grow under our feet during 1986. Congratulations to all on your various achievements. Congratulations too, to all the girls who have achieved call signs during the past year, and to those who have upgraded.

August saw some changes in the ALARA Committee, with the retirement of Helene VK7HD (President), Valda VK3DVT (Treasurer), Marlene VK5QO (Newsletter Editor), Jessie VK3VAN (Sponsorship Secretary), and Joyce VK3VBK (Souvenir Custodian).

Helene remained on the committee as VK7 State Representative. Bron VK3DYF, took over as Newsletter Editor, with other positions being filled by Marilyn VK3DMS (President), Meg VK5AOV (replacing Marilyn as Minute Secretary), Val VK4VR (Treasurer/Souvenir Custodian), and Gwen VK3DYL (Sponsorship Secretary) Margaret VK4AOE, became Vice-President in place of Marilyn.

Sadly, one of our DX members, Hisako JJ1LQI, became a Silent Key in February 1986.

The ALARA Contest was held over 24 hours on Saturday, November 8, UTC. Hopefully we will have a report next month.

Thanks to Mavis VK3KS, for conducting CW practice after the Monday night ALARA nets. Although not too many took advantage of this opportunity, for various reasons, it was appreciated by those who did. Do not forget that during Daylight Saving Time, the Monday night net is held at 1000 UTC.

FLORENCE MCKENZIE

The following article was published in the Mount Isa newspaper The North-West Star, *Monday, September 22, 1986, and was sent to me by Steve VK4KHQ.*

Women celebrate role in the navy

SYDNEY: Australia's war-time Navy Minister Billy Hughes was remembered with wry affection yesterday as women whose skills he was loath to acknowledge celebrated their part of the Navy's 75th anniversary.

The Women's Royal Australian Naval Service (WRANS) was formed in 1941 with a corps of 14 telegraphists who performed vital Morse communications.

However, the story of their entry into the war effort is a tale of an obstinate Minister confronted by a forthright women who stood five foot nothing" and pursued vigorously the belief that "her girls" trained in Morse code could free men to fight.

Florence Violet McKenzie was an electrical engineer who ran a shop in the old Royal Arcade in Sydney, operated amateur radio, corresponded with Einstein, and was also notable for writing the Sydney County Council's first recipe book from cover to cover when electric stoves came in.

"She was a remarkable and delightful woman," remembers Jess Doyle, one of six surviving members of "Mrs Mac's" civilian wireless telegraphy school who went on to found the WRANS.

"She was Australia's first female electrical engineer — and that was in the days before women's lib," she said.

"In December 1940 she wrote to Hughes suggesting her 600 highly trained operators should be permitted to join the Navy's communications division but he refused.

"She made several train trips to try to convince Hughes but he wouldn't believe her."

In 1941, Hughes' lack of faith in the women's technical skills was overturned when a Navy communications director travelled to Sydney to test them.

"He found us highly proficient and recommended we be employed by the Navy," Mrs Doyle said.

"It was not until April that they agreed — and it was another five months before we were allowed naval uniforms."

The Morse operators worked naval watches (split shifts of four and six hours a day), in an often tense and frightening atmosphere as they passed messages to ships in combat.

Mrs McKenzie's girls also set about training a total of 23 000 men in Morse code.

"There was no hanky-panky with Mrs McKenzie, it was all work," said a wistful Mrs Doyle.

The transition into a male domain was not all smooth: others remembered the embarrassment all round as the young women lined up before Navy men on Anzac Day in 1941 for their first "medical."

Yesterday, six of the original 14 WRANS joined a congregation of around 800 people for the unveiling of a commemorative stained glass window in the Royal Australian Navy's Garden Island dockyard chapel.

Past and present Navy women from all states of Australia and as well as New Zealand took part in the ecumenical service to dedicate the window, which depicts the original dark war-time telegraphists' uniform, the white peace- time WRAN uniform and badges of office.

It was unveiled by Lady Stephen, wife of the Governor General Sir Ninian Stephen, who said it commemorated 40 years of service beginning with "the wonderful women who played a 'fighting role' in World War Two."

Mrs Doyle told the congregation it was because of Mrs McKenzie's "foresight, dedication and persistence" that the WRANS were born.

Principal Navy chaplain Ian Dempsey said the history of the WRANS was "a struggle to get started, a struggle to survive and a struggle for equality in what was traditionally a man's world."

Rear Admiral David Martin, flag officer of the Naval Support Command, said the original WRANS had "joined because they were determined to serve Australia, and they set a fine example to the men."

"The Navy accepted them somewhat grudgingly and doubtfully, came to rely on them and then paid them off when the war was over," he said.

The 2500 WRANS were demobilised in 1947 but they were "welcomed back on board" in 1951 and the women continued to serve as WRANS until June last year, when they became members of the RAN.

The absorption into the RAN is regarded with mixed feelings by some of those original [redacted] in.

"It's good the girls are getting the same pay but somehow when they join up now they are competing against the men, and that special lovely feeling between the WRANS and the Navy is beginning to go," Mrs Doyle said.

"It's sad in a way but then of course it's the right thing to do — they should be part of the Navy," said Denise Johnson (nee Owen), another original WRANS member who travelled from Hawaii to take part in the service.

Mrs Johnson said the women knew nothing of Mrs McKenzie's battle with Hughes until it was almost won and she asked them if they would be willing to join a women's emergency signalling corps.

She said she did not regard Hughes as old-fashioned then as "after all we were the first of the services to open up to women."

The other surviving original WRANS are Joan Peck, Joan Cohn (nee Cade), Judy Saunders (nee Alley), and Shirley Grylls (nee Drew).

Mrs McKenzie died in 1982.

As we look toward 1987, plans are well under way for the Get Together to be held later in the year. More details will be available next month.

At the time of writing, propagation is definitely improving and it has been wonderful to talk to some of our DX friends again after such a long period.

Wishing you all a very happy and prosperous [illegible].

73/33 Joy

QSP

YOU'RE NICKED, MATE . . .

Early in August 1986, Harold Crawford GM4VAN, of East Kilbride, was fined £250 after pleading guilty to a charge of fraud. Crawford admitted forming a fraudulent scheme to obtain a City and Guilds of London Institute Certificate with David Boyd, of Glasgow.

Boyd had previously sat the Radio Amateur's Examination twice and failed. Crawford took the examination on Boyd's behalf at Leith Nautical College, Edinburgh on May 13, 1986; he falsely stated that he was Boyd and forged Boyd's signature. Boyd was fined £200.

—From RSGB RadCom, November 1986

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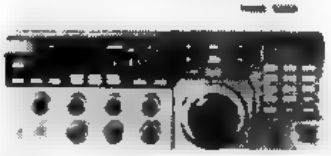

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Building on the experience gained from the production of these outstanding receivers JRC introduces a new model the NRD525 combining advanced performances with the first class construction of the NRD505

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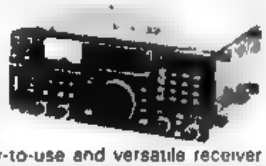

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Primary Frequency: 3.685 MHz
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AMSAT SW PACIFIC
2200 UTC Saturday
14.282 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian elements from the AMSAT Australia Net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGMENTS
Contributions this month are from Bob VK3ZBB, Graham VK5AGR, and AMSAT-Telemail.

The January column is always a very difficult one to prepare due to the very long lead times required. Each year I look for items that are not going to be obsolete by the time they are distributed. This time round, I have two such items. The first relates to the next series of Russian satellites. The document to hand is from the ITU and details the specifications of the respective satellites.

The second item is a short tutorial from Jim Miller G3RUH, on the PSK Telemetry format. As we are all aware, OSCAR-10 put PSK up-front, and by now Fuji-OSCAR-12 would also be emanating PSK for its telemetry and the packet radio experiment.

First the item from the ITU.

INTERNATIONAL TELECOMMUNICATION UNION
INTERNATIONAL FREQUENCY REGISTRATION BOARD (IFRB)

IFRB Weekly Circular/Date 1740/16.09.86
Special Section No AR11/A/320 Satellite Network: RADIO-M Responsible Administration: URS
Information received by the board on
17.06.MM

The information contained in this Special Section has been received by the IFRB pursuant to RR1042 and is published in accordance with RR1044.

Any administration which is of the opinion that unacceptable interference will be caused to its existing or planned space radio-communications services will send its comments to the administration concerned, with a copy to the IFRB, within four months after the date of this publication.

EXPIRY DATE FOR THE RECEIPT OF COMMENTS: 19.01.87
The information reproduced hereunder has been arranged in the form prescribed in Appendix 4 to the Radio Regulations.

INFORMATION SUPPLIED FOR ADVANCE PUBLICATION FOR THE RADIO-M SATELLITE NETWORK
General Information

In the USSR, work is in progress for the development of amateur- satellite service systems (ASSS). In particular, it is planned to launch one or two amateur satellites, designed for use by radio amateurs throughout the world and also for educational and scientific experiments.

Section A General Characteristics
Item 1 — Identity of the satellite network
RADIO-M
Item 2 — Date of bringing into use
BY December 1988
Period of validity of frequency assignments to the space station (Resolution 4, World Administrative Radio Conference, Geneva, 1979)
10 years

Item 3 — Administration or group of administrations submitting the advance information
USSR
Ministere des postes et telecommunications
7, rue Gorki
MOSKVA
MINSVIAZ, MOSKVA
Item 4 — Orbital information relating to the space station

Inclination of the orbit: 83 degrees
Period: 105 minutes
Altitude of the apogee: 1000 km
Altitude of the perigee: 1000 km
Number of satellites: 1 or 2

Section C — Characteristics of the Satellite Network in the Earth-to-Space Direction

Item 1 — Earth-to-Space service area
The whole Earth, depending on the position of the satellite in orbit and the position of the satellite orbit in relation to the Earth.

Item 2 — Class of stations and nature of service
AT, CR

Item 3 — Frequency range
Modes of operation I, II, IV:
21.120 and 21.415 MHz
transponder bandwidth — 40 kHz in one section of the range:
1. 21.260-21.300 MHz
2. 21.210-21.250 MHz
3. 21.160-21.200 MHz

Mode of operation III:
145.787-146.000 MHz
transponder bandwidth — 40 kHz in one section of the range:
1. 145.960-146.000 MHz
2. 145.910-145.950 MHz
3. 145.860-145.900 MHz

Item 4 — Power characteristic of the transmitted wave
These depend upon the design of the station available to the amateur. For good quality relay, an equivalent isotropically radiated power (EIRP) of not more than 100 watts will suffice.

Item 5 — Characteristics of the space station receiving antenna
For all modes — a halfwave dipole, gain G = 2 dB, width of radiation pattern, 80 degrees.

Item 6 — Noise temperature of the receiving space station
2000 K

Section D — Characteristics of the satellite network in the Space-to-Earth Direction

Item 1 — Space-to-Earth service area
The whole Earth, depending on the position of the satellite in orbit and the position of the satellite orbit in relation to the Earth.

Item 2 — Class of stations and nature of service
EA, CR

Item 3 — Frequency range
Modes of operation I and III:
29.360-29.500 MHz
transponder bandwidth — 40 kHz in one section of the range:
1. 29.460-29.500 MHz
2. 29.410-29.450 MHz
3. 29.360-29.400 MHz

Mode of operation II:
145.857-146.000
transponder bandwidth — 40 kHz in one section of the range:
1. 145.960-146.000 MHz
2. 145.910-145.950 MHz
3. 145.860-145.900 MHz

Mode of operation IV:
Simultaneous transmission on the bands 29.360-29.500 MHz and 145.857-146.000 MHz

On each transponder section two beacons operate in the following centre frequencies.

Modes I, III and IV:
1. 29.457 and 29.500 MHz
2. 29.407 and 29.453 MHz
3. 29.360 and 29.403 MHz

Modes II and IV:
1. 145.957 and 145.997 MHz
2. 145.907 and 145.953 MHz
3. 145.857 and 145.903 MHz

Item 4 — Power characteristics of the transmission
Maximum spectral power density:
29.260- 29.500 MHz -41 dBW/Hz
145.857-146.000 MHz: -39 dBW/Hz

Item 5 — Characteristics of space station transmitting antenna
For all modes, antenna gain: 1 dB
Radiation pattern: omnidirectional
Polarisation: linear

Item 6 — Characteristics of receiving earth stations
These depend on the facilities available to amateurs. It will suffice to have a receiving antenna with a gain of 1 to 2 dB and a receiving system with an equivalent noise temperature of 1 000 K to 1 5 000 K.

Now the short tutorial from Jim G3RUH, in which he gives some of his design reasonings on his soon to be released Packet Radio PSK Demodulator for Fuji-OSCAR-12. Although very brief it may give a better appreciation of what PSK (Phase Shift Keying) is about.

PSK — THE THEORY
PSK DEMODULATOR. Demodulating a Phase modulated signal calls (in principle) for two things, a phase reference signal, and a phase detector where the input signal is compared with that reference.

Sometimes the implementation of these requirements lead to a circuit in which it is hard to spot that they are separate requirements — but they are.

PHASE REFERENCE. This has to be extracted from the input signal, and is usually called "carrier recovery." There are two common circuits which do this, the "Costas Loop" and the "Squaring Loop" there are also hybrids. For practical purposes their performance is the same.

PHASE DETECTOR. Its function is to compare the local recovered carrier phase with the incoming signal phase, and output some measure of their difference. There are quite a number of ways of implementing this function, and the choice has to be based on diverse criteria on the one hand, and say economy on the other.

Three typical kinds can be instanced, in descending order of circuit complexity, the analogue multiplier, the modulus or commutator, and the digital EXOR gate. The spread in signal processing performance of these is about 2 dB, in complexity as much as 10:1.

FO-12 MODE JD DOWNLINK LIKELY SNR.
Assume the following: Satellite TX power 1 watt EIRP, range 4600 km, f=435 MHz, RX antenna gain 18 dB, RX noise temperature 1000 K, RX bandwidth 2400 Hz.

These figures give a probable received SNR of 24.3 dB. For the satellite overhead (R=1500 km) the SNR rises to 34 dB there will be fluctuations due to tumbling.

REQUIRED SNR BASED ON BIT ERROR RATE.
Assume packets of 1000 bits, and repeats of 1 in 10 packets. Then the Bit Error Rate needs to be no worse than 1 in 10000. This requires a theoretical E/No (energy/bit to Noise power/Hz) of 9 dB.

Allow 3 dB decoding loss (no receiver/decoder is ever perfect), this E/No need rises to 12 dB, or 16:1. Given the bit rate of 1200 bits/sec, and a RX bandwidth of 2400 Hz (say), the channel SNR

OSCAR-10 APOGEES — JANUARY 1987

			SATELLITE			BEAM HEADINGS					
			APOGEE CO-ORDINATES			SYDNEY		ADELAIDE		PERTH	
DATE	DAY NO	ORBIT NO	UTC HHMM:SS	LAT DEG	LON DEG	AZ DEG	EL DEG	AZ DEG	EL DEG	AZ DEG	EL DEG
1	1	2671	0651:14	-4	157	62	33	71	23	86	4
2	2	2673	0610:14	-4	157	59	26	78	15		
3	3	2675	0529:17	-3	148	76	18	83	7		
	3	2676	1708:48	-3	323					279	2
4	4	2677	0448:20	-3	139	82	10	89	1		
	4	2678	1627:51	-3	314					276	10
5	5	2679	0407:22	-3	129	87	2				
	5	2680	1546:53	-3	305			271	-1	284	18
6	6	2682	1505:56	-3	295			277	6	290	26
7	7	2684	1424:59	-3	286	275	4	283	14	296	34
8	8	2686	1344:01	-3	277	280	11	289	22	307	41
9	9	2688	1303:04	-3	267	287	19	297	29	319	48
10	10	2690	1222:06	-3	258	293	27	305	36	334	53
11	11	2692	1141:09	-2	248	302	34	316	43	351	55
12	12	2694	1100:11	-2	239	312	41	329	48	10	55
13	13	2696	1019:14	-2	230	324	47	345	51	27	52
14	14	2698	0938:17	-2	220	339	51	2	52	42	47
15	15	2700	0857:19	-2	211	356	53	19	50	53	40
16	16	2702	0816:22	-2	202	13	52	34	46	62	33
17	17	2704	0735:24	-2	192	29	49	46	41	69	25
18	18	2706	0654:27	-2	183	42	43	56	34	75	17
19	19	2708	0613:29	-2	174	53	37	64	27	81	9
20	20	2710	0532:32	-1	164	62	30	71	19	86	0
21	21	2712	0451:35	-1	155	69	22	77	11		
22	22	2714	0410:37	-1	145	75	14	83	3		
	22	2715	1550:08	-1	321					276	3
23	23	2716	0329:40	-1	136	81	6				
	23	2717	1508:11	-1	311					282	11
24	24	2718	0248:42	-1	127	86	-2				
	24	2719	1428:14	-1	302			276	-1	287	19
25	25	2721	1347:14	1	293			280	7	294	27
26	26	2723	1306:16	-1	283	278	4	286	15	302	34
27	27	2725	1225:19	-1	274	284	12	293	22	312	41
28	28	2727	1144:21	-0	265	290	20	301	30	324	47
29	29	2729	1103:24	-0	255	298	27	310	36	339	51
30	30	2731	1022:26	-0	246	306	34	321	42	357	53
31	31	2733	0941:29	-0	237	317	41	335	47	14	52

SATELLITE ACTIVITY FOR THE MONTH OF SEPTEMBER 1986

1. LAUNCHES

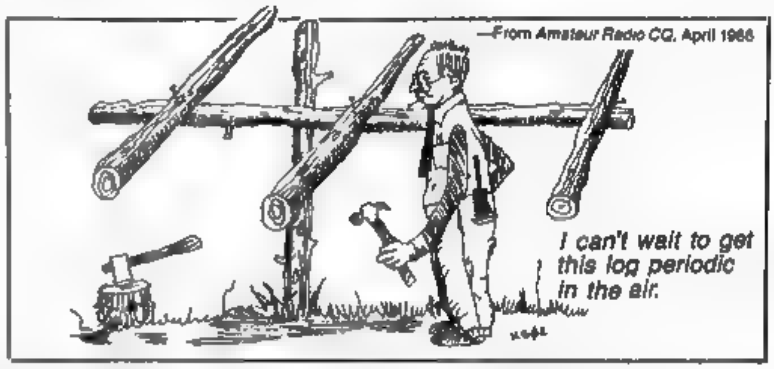
The following launching announcements have been received:

INTL NO — 1986	SATELLITE	DATE	NATION	PERIOD min	APG km	PRG km	INCL deg
066A	Cosmos 1775	Sep 03	USSR	88.4	405	218	70.3
067A	Cosmos 1776	Sep 03	USSR	94.5	521	478	74.0
068A	Molniya 1-59	Sep 05	USSR	12hr15m	40556	645	63.0
069A	USA-19	Sep 05	USA				
070A	Cosmos 1777	Sep 10	USSR	100.8	619	781	74.0
071A	Cosmos 1778	Sep 16	USSR	11hr15m	19123	19123	64.8
071B	Cosmos 1779	Sep 16	USSR	11hr15m	19123	19123	64.8
071C	Cosmos 1780	Sep 16	USSR	11hr15m	19123	19123	64.8
072A	Cosmos 1781	Sep 17	USSR	90.4	405	217	70.4
073A	NOAA 10	Sep 17	USA	101.2	826	808	98.8

2. RETURNS

During the month 39 objects decayed including the following satellites.

1962-071A	Transit-5A	Sep 25
1986-053A	Cosmos 1764	Sep 11
1986-063A	Cosmos 1772	Sep 03
1986-066A	Cosmos 1775	Sep 17



—From *Amateur Radio CQ*, April 1986

needs to be better than 16*1200/2400=8:1 in power (3:1 in voltage), ie a minimum of 9 dB.

THE PRACTICE

For my JAS-1/FO-12 modem design I had to choose 1. a carrier recovery circuit, and 2. a phase detector.

The Carrier Recovery Circuit had to be simple, robust and repeatable. I saw no need for analogue processing here — a digital squaring loop is simple and adequate, and caters automatically for a wide range of input signal levels.

I tried out several circuits for the squarer, the simplest consisting of an RC network and an EXOR gate. It worked beautifully — but was just not repeatable. In the end I returned to my AO-10 design based on 1/4 cycle delay line — tried, trusty, robust!

In choosing the Phase Detector, I looked at the signal-to-noise expectations for this application. A minimum received SNR of 9 dB is needed (see above). Yet, the likely received SNR was going to be +15 dB up on this, rising +10 dB more as the satellite approached, less any tumbling effects.

Weighing this up I came to the conclusion that for practical purposes the satellite signal would appear to be pretty well noiseless most of the time for a modestly equipped station.

Was there any point therefore, in trying to drag the last couple of dB out of the ether, I felt not — hence the choice of a simple EXOR gate phase detector.

—de Colin VK5HI

Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014

AWARDS ISSUED RECENTLY

WAVKCA

1505 Thomas Berezowski JE2ZXX
1506 Jiro Anzai JA8IYI
1507 Teruo Sato JA7COE

YASME AWARD

Here is a list of eligible calls, correct at May 16, 1986. It is necessary to work 30 call signs for the Award.

3C0AN
3C1EG
3D2KG
3D6QL
4T4WCY
4W1WY
5L2KG
5T5KG
5V1KG
5V4MY
6L6MY /Qatar
6T1YP — Marty
6W8CD
7P8KG
8P6QL
9G1KG
9J2LC
9K2QL
9L1KG
9M1OAT
9Y4KG
AA5LES
AC0MLY
AJ3AA
AX2HD
C21MI*
CN8HF
CR1OAB
CT2YA
CT3AU
CT3BZ
CT9AT
DL4ZB
DL4ZBD
DL4ZC
EA8CR
FA6JD
FG0FOK
FG0FOL /FS
FK0KG
FL8MY
FW0FOL
FO0DCW
KL7KG
FO0XX
FO0XX /MM
FO8AN
FW8DW
FY0FOL
G2DC
G5ACI /AA
G7DM /MM
GC5ACH /W6KG
GC5ACI /WB6QEP
GD5ACH /W6KG
GD5ACI /WB6QEP
OH2BH /ZD3X
OJ0DX — Marty
OJ0MR — Marty
PJ8KG
SV1GA /A
TI9RC — W0MLY
TU2CA
TY2KG
TY2MY
VK2EO
VK2HD
VK9TM
VP1KG
VP2ARS
VP2AY
VP2DM
VP2EEQ
VP2GDW
HC2VB
HC8VB
HI6XOL
HI8XAL
HK0AA — Danny
HK3NBB
HR0QL
HS1ABD
HS3AL
HS5ABD
HZ1AB**
HZ1MY
J2AHI
J2ODU
J2USA
J3ABV
J6LOO
J7DBB
JA1KSO
JA2KG
JA2US
JY8KG
K2CC
K3ZO
K3ZO /KH3
K4BVD
K4KCV
K4WAB
K5JLQ
K5RC
K6ALH
K6AN
K6WAP
K7JDG
K7JG
KC8SZ
KE6ITU
KG4KG
KG6SZ
KG6SZ /KC6
KL7OTB
KL7JDG
KL7USA
KM6ALH
KV4AA
KZ5WD
LU5HFI
W6KB
W6SF
W7MG
OH0AM
OH0M
OH2AM /OH0
OH2BH
W6BSY
W6WS /KG6
W6DOD
W6GN
W6IPF
W6KFD
W6KG
W6KG /4X
W6KG /A4
W6KG /A7
W6KG /AJ3
W6KG /CE0
W6KG /CP6
W6KG /HC8
W6KG /KH0
W6KG /KG6
W6KG /PZ1
W6KG /SV5
VP2KAH
VP2KF
VP2KFA
VP2LW
VP2MAQ
VP2MX
VP2SAX
VP2SW
VP2VB
VP2VDJ
VP4DM
VP5VB
VP7VB
VQ6MY
VR1B
VR1Z
VR2EO
VR4AA
VR8B
W0MLY
W0MLY /TJ8
W0MLY /TL8
W0MLY /TN8
W0MLY /TR8
W0MLY /TT8
W0MLY /TZ2
W2USA
W4KE
W4DVL
W4QDZ
W4TO
W4ZEW
W5OGJ
W5NC
W6AHI
W6AM
W6ANS
W6KG /SV8
W6KG /TI5
W6KG /ZS
W6LDD
W6LY
W6OAT
W6QL
W6QL /6Y5
W6QL /8R1
W6QL /CE0
W6QL /HC1
W6QL /HK3
W6QL /PJ2
W6QL /SV5
W6QL /VP2A
W6QL /Z2
W6QL /ZP5
W6RGG
W7JFG
W7KG
W7YA
W8EWS
W9AC
W9SZR
WA5LES
WA6DFR
WA7MIN
WW6ITU
XE2FU
YJ8KG
YV0AB
ZB2AX
ZD3I
ZF2CI
ZK1BY
ZM6AW
ZS3/ W6QL

* 3/1/76 through 3/25/76
**2/19/83 through 2/20/83

The YASME Award Custodian is:
Dick McKercher W0MLY

ORARI AWARDS PROGRAM

Organisasi Amatir Radio Indonesia (ORARI) has pleasure in announcing a new awards program.

1. The *Jakarta Award* (JA/SWL-JA), for confirmed contacts with, or having heard from, licenced amateurs in Jakarta (0 call area only), the capital of the Republic of Indonesia.
2. *Worked All Indonesia Award* (WAIA/SWL-WAIA), for confirmed contacts with, or having heard from, licensed amateurs in each of the [illegible].
3. *Worked The Equator Award* (WTEA/SWL-WTEA), for confirmed contacts with, or having heard from, licensed amateurs in countries along the Equator.
4. The *Danau Tobe Award* (DT/SWL-DT), for confirmed contact with, or having heard from, licensed amateurs in the Province of North Sumatra, Indonesia (6 Call Area).
5. The *Borobudur Award* (BA/SWL-BA), for confirmed contact with, or having heard from, licensed amateurs on the Central Part of Java, Indonesia (2 Call Area which includes the Provinces of Central Java and Yogyakarta).

GENERAL RULES

ORARI Awards will be issued to licensed amateurs for two-way SSB, CW, RTTY, Mixed or Single Mode, Mixed or Single Band in the 80, 40, 20, 15 and 10 metre bands only. The SWL Awards in the same category will also be available. The applicant may request endorsement for such distinction accordingly.

To be valid, all contacts or listening must be made on or after July 9, 1968.

Claims must be accompanied by a QSL Card List (GCR) furnished with the call signs of stations worked, dates, bands and modes of contacts meeting the requirements of the award concerned. Rules and requirements will be specified, when required, in each of the award programs.

The QSL Card List must be accompanied by a statement from the applicant's national society, club station, or from any two amateurs other than the applicant, that the QSL Card of the contact listed is in the possession of the applicant, and that the items of the cards are correctly listed.

A fee of US$8 or 16 IRCs will be charged per award and should be sent along with the application to the respective award manager.

Only contacts with land stations within the same country will be acceptable.

JAKARTA AWARDS (JA/SWL-JA)

DX stations need confirmed contacts with, or having heard from, a total of 20 stations including at least one Jakarta Club Station.

Send log extract (GCR) in alphabetical order by prefix along with the awards fee to the Award Manager, M S Lumban Gaol YB0WR, PO Box 98, Jakarta 10002 Indonesia.

Club stations in the 0 call area are:
YB0s — ZAA, ZAB, ZAD, ZAE, ZAF, ZBA, ABB, ZCA, ZCB, ZCD, ZCE, ZDB, ZDC, ZDD, ZDE, ZDG, ZEA, ZEE, ZZ.

WORKED ALL INDONESIA AWARD (WAIA/SWL-WAIA)

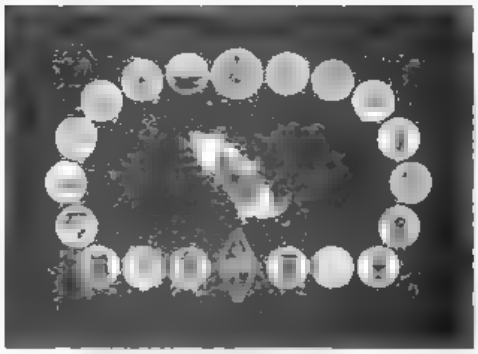
DX stations other than those in CQ Zone 28 need confirmed contacts with, or having heard from, two stations from each area, a total of 20 QSL Cards.

Send log extracts (GCR), in alphabetical order of prefix, a total of 30 QSL Cards together with award fee, to the Award Manager, M Maruto YB0TK, PO Box 96, Jakarta 10002, Indonesia.

WORKED THE EQUATOR AWARD (WTEA/SWL-WTEA)

Is issued for confirmed contacts with, or having heard from, countries according to the ARRL DXCC country list along the Equator as follows:

C2, HC, HC8, HK, KH1 & KB6, PR-PY, PY0 (St Peter), S9 (Sao Tome), T30, T31, T32, TN, TR, YB5, YB7, YB8, 5X, 5Z, 6O, 8Q, 9Q.



The WTEA/SWL-WTEA is issued in three classes:

i For confirmed contacts with, or having heard from, 15 countries.
ii For confirmed contacts with, or having heard from, 12 countries.
iii For confirmed contacts with, or having heard from, eight countries.

For all Classes, contact with or having heard from YB5, YB7, and YB8 is obligatory.
Send log extracts (GCR), in alphabetical order by prefix along with the award fee to the Award Manager, Ben S Samau YB0EBS, PO Box 96, Jakarta, 10002, Indonesia.

DANAU TOBA AWARD (DT/SWL-DT)
DX stations need confirmed contact with, or having heard from, a total of 10 stations in the Province of North Sumatra including at least one North Sumatra Club Station.

Send log extract (GCR), in alphabetical order by prefix along with the award fee to the Award Manager, H Jans Fauzy YB6MF, PO Box 232, Medan, North Sumatra, Indonesia.

Club stations are as follows:
YB6s — ZAA, ZAB, ZAC, ZAD, ZAE, ZAF, ZAG, ZAH, ZAI, ZAJ, ZES, ZZ.

BOROBUDUR AWARD (BA/SWL-BA)
DX stations need confirmed contact with, or having heard from, a total of 25 stations in the 2 Call Area.

Send log extract (GCR), in alphabetical order by prefix along with the award fee to the Award Manager, Timmy Dhanuwijaya YB2BGZ, PO Box 88, Semarang, Indonesia.

AWARD NOTES
When applying for an award, courtesy demands that you observe the following:
Print your name, call sign and address.
Clearly state what award and endorsements you are applying for.
Send the application to the respective award manager according to the award claimed and enclose the award fee (in money order or IRCs) as requested. Personal cheques are not accepted.
ORARI stresses the honour of fair play and sportsmanship of the applicant working towards these awards. Use of poor ethics will result in permanent disqualification.

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JUST DREAMING

Bob Colsell
7 Martin Close, Emerald Beach, Qld. 2456

Most people are aware nowadays of the close parallel between computer memories and human brains. Although a type of circulating delay-line memory exists along some of the connections between different parts of the brain, biological studies have shown that the human memory is largely digital in concept. The number of neurons, or binary bits, has been estimated at 10 to the power of 17. Even if the popular estimate of only using about 15 percent of one's brain were true, we still appear to have some numerical advantage over even the mightiest electronic computers, say about a billion times — an American billion, that is. So why can't I remember peoples names when I want to introduce them?

Many years ago, when I was only middle-aged, I remember a very interesting discussion with one of my fellow programmers on this subject. We were, at the time, involved with the new-fangled linked index files (that will tell you how long ago it was!), and we decided that the problem had two facets.

One was the fact that the pulse handling process of the brain was electro- chemical involving osmosis. Not only was the transfer rate slow by electronic standards, but also it seemed probable that the memory cells would suffer from a slow leakage unless periodically refreshed. Thus it is easy for us to recall a frequently used telephone number, whereas a number not used for some time may be hard to remember.

The other factor could be the method of addressing the memory cells. It seemed likely that, with the enormous number of cells available, there was considerable redundancy. A telephone number for example, was held in many places each with a different address, that is to say, it could be accessed from different stimuli. It might be associated with the person's name, with the sound of the number when spoken, with the sight of the number when written down, even with the physical act of dialling it, and no doubt, with many other things. This seemed to explain how sometimes I could not recall a particular number, so picked up the phone and dialed inquiries — and promptly dialled the wanted number correctly! It also explains how an item suddenly comes to mind hours after it is wanted. The 'background' part of the brain (or sub-conscious, if you wish) discovered a new address that had not been used when you were trying desperately to remember the item via a normal stimuli.

Now let us consider dreams. It has been established that there are two types of sleep. One is the normal restful type of which almost all people require between seven and eight hours in every 24. But, cunning devices attached to sleepers show that there is another type of sleep during which there is rapid eye movement (REM). During this period (usually several minutes) an electro-encephalogram shows violent waveforms instead of the peaceful alpha rhythms. Most people have four or five such REM periods per night. If the subjects were woken up during a REM period they said they had been dreaming. But if woken during a peaceful period they had no knowledge of any dreams even though the EEG showed that they had had several REM periods during the night. The conclusion seems inescapable that the REM periods are when we dream and that our dreams may last several minutes.

During this experiment, they also kept some of the subjects without any sleep at all for extended periods. The absolute limit appeared to be about a week, but after some 48 hours the subjects became irritable and aggressive. Can't say I blame them! But the really interesting thing was that, when they deprived them of REM sleep only (by waking them up as soon as the instruments indicated REM then letting them back to sleep again) they showed exactly the same reactions as if they had had no sleep at all. Even though they had enjoyed their full ration of normal sleep. So, clearly dreams are necessary. But why?

Well, from now on I can refer to no previous experiments but only offer suggestions and possibilities. I recall many years ago reading a book called *An Experiment in Time* by J W Dunne (or was it Donne). Anyway, he persuaded a group of people to keep a note book and pencil under their pillow and to write down furiously as soon as they woke up all they could remember about their dreams. Then a week or so later, to scan the book looking for events before and after the date of the dream. His rather fanciful idea was, that during sleep, the mind wandered in time both past and future. The conclusions he arrived at were somewhat specious being heavily oriented to what he wanted to believe. The book was written a long time ago and was insignificant except for one point.

In one of his 'explanations' he pointed out how the brain can 'misinterpret' an experience or an effect. One example he gave was a dream that somebody was throwing lighted cigarette-ends at him. What had actually happened a few days previously was that he had poked a log on the fire and it threw out a shower of sparks. This concept has enabled me to 'interpret' almost all the dreams I have nowadays and to relate them to isolated and disconnected incidents in the recent past. Sometimes three or four such incidents are included in one dream. Being unrelated, they make up a typical weird dream story. The brain seems to be doing its best to relate them in some way so as to make some sort of sensible story. But why?

Well, with all the mass of data presented to the brain every day it would not be unexpected for the occasional error to creep in. I wonder if some items of data have not got a proper address? Maybe the brain is taking all these loose ends and trying to hook them in somewhere and generally tidy things up. What computer disc pundits would call 'house-keeping.' It seems possible, doesn't it?

Or am I just dreaming?

ar

Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
56 Baden Powell Drive, Frankston, Vic. 3199

This month's Education column presents a sample theory examination paper for NAOCP candidates. Select the correct or most appropriate alternative and check against the answers at the end of the paper.

1 An electric current consists of a flow of:
a. protons.
b. electrons.
c. atoms.
d. neutrons.

2 The filter in a power supply serves to:
a. reduce the ripple frequency.
b. convert the AC into pulsed DC.
c. provide a constant load.
d. reduce the ripple amplitude.

3 Rapid fading of long distance HF signals may occur because of:
a. changes in sunspot numbers.
b. weather variations around the transmitter.
c. temperature variations in the upper atmosphere.
d. signals travelling different paths and arriving out of phase.

4 In comparison with a single conversion receiver, a double conversion receiver has:
a. better image rejection.
b. better CW reception.
c. greater bandwidth.
d. fewer IFs.

5 The inductive reactance of a coil depends on the:
a. conductivity of the wire.
b. voltage applied.
c. frequency applied.
d. current flowing in it.

6 A quarter-wave vertical antenna has:
a. a voltage maximum at the tip.
b. higher input impedance than a dipole.
c. high gain.
d. a voltage maximum at the feed-point.

7 The operating frequency of a VFO is varied by altering the:
a. feedback voltage or current.
b. series resistor.
c. capacitance or inductance of the circuit.
d. capacitance across the crystal.

8 'Key clicks':
a. are caused by dirty key contacts.
b. occur only when the oscillator stage is keyed.
c. may be cured by using a keying relay.
d. occur due to the sharp make and break of unfiltered keying.

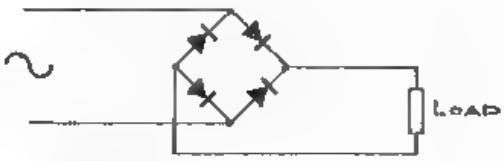
9 The power in each sideband of a 100 percent modulated AM signal is equal to:
a. the power in the carrier.
b. 50 percent of the power in the carrier.
c. 25 percent of the power in the carrier.
d. 10 percent of the power in the carrier.

10 A correctly operated novice transmitter causes severe interference to one television set in close proximity but not to others. The problem is probably due to:
a. harmonic radiation.
b. front end overload of the television set.
c. cross-modulation with a nearby broadcast station.
d. radiation of parasitics.

11 The IF filter stage in an SSB transceiver:
a. prevents radiation of harmonics.
b. removes one sideband.
c. regulates the power supply.
d. suppresses the carrier.

12 'Splatter' occurs when:
a. the oscillator frequency changes during transmission.
b. two SSB signals are separated by less than 3 kHz.
c. a transmitter is modulated in excess of 100 percent.
d. a receiver cannot reject an unwanted image frequency.

13 If the maximum load current is 1.5 amps, the current rating of each diode should be no less than:



a. 1.0A.
b. 2.0A.
c. 0.5A.
d. 0.15A.

14 The detector stage of an AM receiver:
a. separates the audio modulating frequency from an RF signal.
b. requires positive feedback to maintain operation.
c. reinserts the original carrier frequency.
d. may consist of back to back diodes.

15 To raise the strength of a received signal by 6 dB, the output power of the transmitter would need to be:
a. doubled.
b. tripled.
c. quadrupled.
d. multiplied by six.

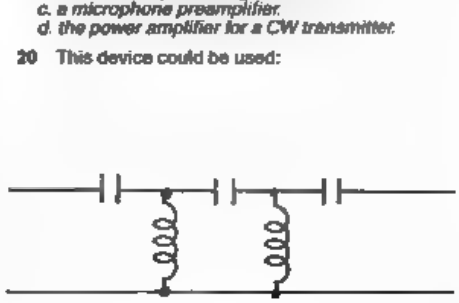
16 The parasitic elements of a Yagi antenna:
a. increase the angle of radiation.
b. increase the gain.
c. are most effective when spaced at half wavelengths.
d. are usually longer than the driven elements.

17 In a thermionic vacuum tube, the HT voltage is applied to the:
a. filament.
b. cathode.
c. control grid.
d. anode.

18 The SWR of a transmission line:
a. depends on its impedance.
b. is a measure of the power dissipation in the line.
c. is the ratio of the maximum to minimum current in the line.
d. depends on the power output of the transmitter.

19 A class C amplifier could be used as:
a. the final stage of an SSB transmitter.
b. an audio amplifier stage in a receiver.
c. a microphone preamplifier.
d. the power amplifier for a CW transmitter.

20 This device could be used:



a. at the output of a novice transmitter to prevent [redacted]
b. at the antenna input of a television receiver to reduce amateur TVI.
c. in the earth lead of a television receiver to prevent power line interference.
d. at the input of a novice receiver to reduce cross-modulation.

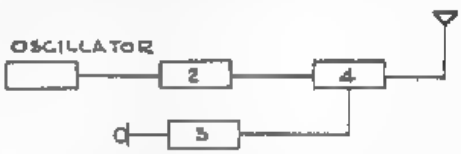
21 A silicon diode will conduct when:
a. the anode potential is more than 0.6 volt positive to the cathode.
b. the N material is more than 0.2 volt positive to the P type.
c. the PIV rating is reached.
d. subjected to heat.

22 The impedance of a transmission line depends on:
a. its length.
b. the diameter and spacing of its conductors.
c. the frequency applied.
d. the resonant frequency of the antenna being fed.

23 The quality of a CW transmission can be checked by:
a. monitoring the power at the transmitter output.
b. watching the swing of the S meter needle.
c. listening on a simple diode detector receiver.
d. monitoring the wave envelope on a CRO.

24 When tuning the output circuit of a transmitter, the direct current reading dips because:
a. the drive to the final stage is reduced.
b. the final amplifier goes into current limiting.
c. the output circuit impedance is maximum at resonance.
d. the HT voltage to the output stage drops.

25 The function of stage two in this simple AM transmitter is to:



a. prevent changes in the load from affecting the oscillator frequency.
b. prevent radiation of parasitics.
c. amplify AF.
d. mix the RF and AF signals.

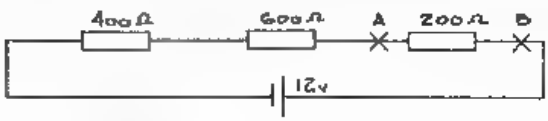
26 A zener diode voltage regulator provides a:
a. constant resistance network.
b. steady current regardless of forward bias.
c. constant voltage drop when the reverse bias exceeds a specified value.
d. secondary function as an AC rectifier.

27 The D layer of the ionosphere:
a. is most intense at night.
b. is an efficient reflector of high frequencies.
c. is present only at the peak of the sunspot cycle.
d. absorbs the high frequencies.

28 The mixer stage in an SSB transmitter:
a. converts the signal to the desired output frequency.
b. converts AF to RF.
c. combines the two sidebands so that either can be selected.
d. removes the unwanted sideband.

29 A 'balanced' transmission line has:
a. one conductor earthed.
b. no standing waves.
c. an impedance equal to the output impedance of the transmitter.
d. both conductors at the same potential relative to earth.

30 The potential difference between points A and B is:



a. 12 volts.
b. 6 volts.
c. 4 volts.
d. 2 volts.

31 In an NPN transistor, the P type material is [redacted]:
a. base.
b. source.
c. emitter.
d. collector.

32 Percentage modulation of an AM signal can be measured by:
a. displaying the wave envelope on a calibrated CRO.
b. inserting an RF power meter in the antenna lead.
c. listening on a monitor receiver.
d. calculation from the current flowing in the final amplifier.

33 Ground propagation at HF:
a. improves at higher frequencies.
b. varies with the conductivity of the ground surface.
c. is more effective by day than by night.
d. is more effective using vertically polarised signals than horizontally polarised signals.

34 In a varicap diode, the depletion layer:
a. width increases as the device temperature rises.
b. is decreased when the reverse bias is increased.
c. acts as a capacitor dielectric when the diode is reverse biased.
d. acts as a capacitor when the diode is conducting.

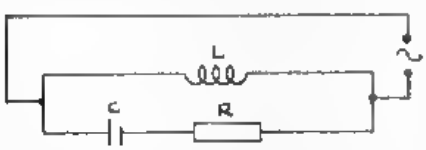
35 A broadcast receiver is likely to be suffering cross- modulation interference when:
a. a weak unwanted signal is on the same frequency as the desired signal.
b. a strong unwanted signal is superimposed on a weak wanted signal.
c. the image frequency of a broadcast station falls within the broadcast band.
d. the interfering signal is heard at approximately 15 kHz intervals across the band.

36 The local oscillator frequency in a superheterodyne receiver is set so that:
a. the sum of it and the wanted signal frequency equals the IF.
b. the difference between it and the wanted signal frequency equals the IF.
c. it is twice the IF.
d. it is usually below the wanted signal frequency.

37 A vertically polarised radio wave:
a. has a vertical magnetic field.
b. can only be received on a vertical antenna.
c. is radiated from a vertical antenna.
d. will be less prone to interference.

38 Radiation of harmonics from a novice transmitter could be reduced by:
a. minimising stray capacitance and inductance in RF circuits.
b. using a more directional antenna.
c. changing to open wire transmission line.
d. connecting a low pass filter at the transmitter output.

39 The impedance of this circuit will:



a. be maximum at the resonant frequency.
b. depend only on the values of L and C.
c. be zero when $X_L = X_C$.
d. be minimum at the resonant frequency.

40 A test instrument containing a moving coil meter together with a source of DC energy is used to measure:
a. AC voltage.
b. RF voltage.
c. resistance.
d. reactance.

41 The ability of a receiver to separate signals on closely adjoining frequencies is known as:
a. dynamic range.
b. stability.
c. sensitivity.
d. selectivity.

42 For safety reasons a mains powered amateur transmitter should be wired so that the:
a. fuse is in the neutral lead.
b. fuse is in the earth lead.
c. power switch is in the active lead.
d. chassis is connected to the neutral lead.

43 To enable an AM receiver to also receive CW it is necessary to add a:
a. BFO.
b. linear amplifier.
c. diode detector.
d. second IF stage.

44 The arrow in this JFET symbol indicates:

a. that it is an N channel type.
b. the direction of electron flow.
c. the emitter.
d. the base.

45 The DC input power to a transistor final amplifier stage can be calculated from:
a. supply voltage and β of the transistor.
b. emitter current and base voltage.
c. base current and base voltage.
d. supply voltage and collector current.

46 A novice station operating on 21.150 MHz causes harmonic interference on only one television channel which is most likely to be:
a. channel 0 (45-52 MHz).
b. channel 2 (63-70 MHz).
c. channel 4 (94-101 MHz).
d. channel 6 (174-181 MHz).

47 An electrolytic capacitor differs from a normal capacitor in that it:
a. must be connected so that correct polarities are [redacted].
b. has a mica dielectric.
c. is most useful at RF.
d. has a time constant of zero.

48 A mains voltage of 240 volts RMS will have a peak-to-peak voltage of about:
a. 170 volts.
b. 340 volts.
c. 480 volts.
d. 680 volts.

49 An EMF is induced in a conductor when the magnetic field around it:
a. has a high value.
b. is parallel to it.
c. changes.
d. is at right angles to it.

50 The domestic mains power in most of Australia is usually:
a. 220 volts AC, 25 Hz.
b. 240 volts AC, 50 Hz.
c. 110 volts AC, 60 Hz.
d. 240 volts DC.

ANSWERS TO NAOCP TRIAL EXAMINATION PAPER

1 — b	11 — b	21 — b	31 — a	41 — d
2 — d	12 — c	22 — b	32 — a	42 — c
3 — d	13 — b	23 — d	33 — b	43 — a
4 — a	14 — a	24 — c	34 — c	44 — d
5 — c	15 — c	25 — a	35 — b	45 — d
6 — a	16 — b	26 — c	36 — b	46 — b
7 — c	17 — d	27 — d	37 — c	47 — a
8 — d	18 — c	28 — a	38 — d	48 — b
9 — c	19 — d	29 — d	39 — a	49 — c
10 — b	20 — b	30 — d	40 — c	50 — b

BEACONS

A reminder that the *Beacon Policy Paper* is in course of preparation and will be presented to the 1987 Federal Convention. To date, member input has been limited.

If you have an interest in beacons, why not spend the holiday period putting your thoughts on paper and sending it to: FTAC, PO Box 300, Caulfield South, Vic. 3162.

The framework of the paper is being prepared by Ron VK1RH.

-Contributed by Tim Mills VK2ZTM

Thumbnail Sketches

Alan Shawsmith VK4SS
35 Whynot Street, West End, Qld. 4101

VINCE JEFFS VK4VJ — AOCP Brisbane 1931

The rather premature death of this talented and erudite amateur in 1970, at the age of 58-years, was very much the WIA's loss. He was a dedicated member, involved in almost every facet of the Institute's affairs. A regular lecturer at classes, he imparted his considerable technical knowledge to students, especially in the then new theory of transistors, SSB and five metre activity, and being a capable code operator, he instructed in Morse.

VK4VJ first began operating from Taringa, Brisbane, conducting several successful five metre and 200 metre tests from this QTH. His endless efforts included many home-brewing projects — one being an exact duplication of the then modern *Racal* amateur band receiver, a masterpiece.

Radio work occupied almost his whole life. First employed by Motor Traders (generator rewind section), Vince then moved to Crammond Radio, North Quay, Brisbane (design and service) during WWII. Finally, he set up his own shop, *Jeffs Radio* in the Valley and remained there until he became too ill to work.

Vince's interest in Field Days (HF and VHF), Scouting and Conventions never flagged. For a time he operated and managed the WIA official station, VK4WI. It is gratifying to know that before he became a Silent Key the Institute recognised his tireless efforts and talents by bestowing Life Membership upon him (1970).

Mark Anthony's eulogy to Brutus fits Vince VK4VJ, very well: "His life was gentle and all the virtues so put together in him that nature might stand up and say to all the world, 'This was a man!'"

TECHNICAL MAILBOX

PREVENTATIVE & FIRST-IN MAINTENANCE

VK5 . . Glenelg, SA

What preventative maintenance can be carried out on amateur station equipment?

Judging from most shacks I know Ken, the first step would be the use of a broom and vacuum cleaner! In some cases, the hiring of a large trailer and several trips to the local dump would be a prior step!

Well Ken, I covered in November's AR, replacing final PA tubes in transceivers. Here we will have a look at the transceiver.

Many adopt the viewpoint that while something is running okay, then do not touch it as preventative maintenance may cause more faults than it prevents.

It is a little like going to the dentist. Miss for some time and the resulting fix will be both painful and expensive.

Any equipment that uses forced air cooling just has to be looked after. This covers the usual tube and some solid-state PAs as well as linear amplifiers.

Heat, fans and high voltage are a sure fire combination for failures. High voltage electrostatically attracts dust. Fans suck in more dust. Moisture plus dust enters the fan bearings as well as accumulating on the blades. The fan slows and the motor heats. Tubes get hotter and the tube dissipation increases further. Dust arcs over. Problems!

Leaving your AR on top of the ventilation inlets/outlets, or placing rigs in a position close to the wall, restricting air flow, should be avoided. Similarly, sitting a rig on soft foam also will reduce ventilation.

Nowadays, with the rigs becoming smaller and output powers increasing, the heat generated must be radiated somewhere. Hence, the heat sinks and fans. Preventing their efficient operation by restricting air flow must be avoided.

It is beyond most amateurs' capability to maintain a rig to the manufacturer's specifications. Maintaining commercial equipment that is found in the majority of amateur stations these days is impractical unless you have more than the basic test equipment. Simply put, if you have not the equipment, the knowledge (obtained from the manufacturer's maintenance handbook) will be of little use. Amateurs, being as they are, are not prone to accept the situation without first "having a go."

Tweaking everything in sight, hoping for a miracle cure to manifest itself, is a guarantee of butchering the rig and may finish by costing you far more to have it fixed by an authorised dealer.

Nevertheless, many of us are prepared to at least attempt to locate the fault area. Hopefully, when the rig "stops" and the fuse remains intact it just may not be too serious. If you have a service handbook it is worth trying to go a little further.

Before removing the covers, analyse the nature of the fault.

Naturally, you have checked that your antenna has not fallen down or other seemingly obvious, but sometimes overlooked situations. It is a little hard to load into an antenna on the ground and it surely does not tend to hear too well either!

Does it receive? Does it transmit? Is the fault common to both? Is it band related? Is it intermittent? And if so, is it related to temperature changes? Try and gather as many facts as possible.

Study the manual and establish the signal paths. Look at the layout and define what boards do what and where they are physically located. Next turn to the manual and find out just what screws have to be removed to gain access. Undoing each screw in sight can, and generally does, cause consternation when parts start to fall off that should remain in place!

Before commencing, clean an area of the work bench where you can work comfortably and where any dropped screws can be readily located. If you have the misfortune to accidentally drop a screw into the rig, *do not* leave it there, difficult as it may be to find and extract. Murphy dictates that it will have lodged in a place that will cause the most damage should power be applied. It will, of course, never shake loose easily and when it does it will rocket off into oblivion! Naturally, you have the power disconnected before starting this operation.

Now that you have access, know the fault area and can relate the boards to the signal paths, the next suggested step is to look for interconnect or mechanical board failures. It is probable that this may only be your problem. Wriggle and move connectors, plugs, sockets, etc in the areas dictated by your fault analysis. If it is a "permanent fault" and no amount of wriggling will change the situation, the next step for most amateurs is to "button it up" and take it to the authorised dealer.

Some amateurs may be fortunate to have at hand a RF Signal Generator, RF Power Meter, CRO, and VTVM (or equivalent) that will enable further delving into the "innards." Naturally, those with such equipment would know how to drive and use such equipment. However, the compactness and construction of modern rigs is such that it can be most difficult to service without having the correct extension cables on hand. Even then, when the fault is located, getting the replacement part could give rise to difficulties. It appears from several stories I have been told, at least one quite large dealer seemingly is most reluctant to carry the most basic of spares! Cases of having to wait two months for output transistors, for a rig under warranty, indicates little concern is given to the buyer after purchase!

To Summarise:

1. Ascertain that the fault actually exists and is not the effect from an external device.
2. Define as best you can the nature of the fault for this, as a last resort, will help the service organisation.
3. Study the handbook to help define the fault, locate the respective boards, and method of access to the inside of the rig.
4. Remove the covers with the power removed from the rig and thereafter be aware of voltage hazards.
5. Do not touch any of the internal presets, tuning slugs, etc but confine your probing towards a loose connector, intermittent connection.
6. Stop when you have exhausted the above steps and seek help, and,
7. Accept that although you are technically capable of finding the fault you are limited by inadequate test equipment or accessories to progress further.

OX1SN/SM

Dear Nick

Firstly, congratulations on obtaining DXCC on your two-metre hand-held on the 24/25.

Regret, unable to offer any further suggestions, other than those you have tried, to rid your hand-held of soot.

Noting your position surely you could place an order (with yourself) for a replacement transceiver for next years activities!

■

THE OBSERVER'S LOVE STORY OR CORRUPTED CALL SIGNS

Especially written for *QTC* Christmas Supplement by ex- 4PM

NOTE To obtain the sense of this rhyme simply substitute the name of the operator (obtained from the key below) for the call sign of the amateur mentioned — and forgive the poet's licence.

He gazed into her pale puce eyes. "Darling" he cried, "You are my 4LJ. 4SM make you 4CR beyond your wildest dreams. 4CG I have in plenty. Dearest, you are 4YN to me are you not?"

The girl looked out into the 4RK and sipped her 4KY. "But you are only a 4HB" she said, "the 4DC you live in would not suit me. Why 4BD everywhere!" "Ah" he cried, "I 4JG that but what were you before you inherited your 4CG. Just a 4AK. Remember you will not always be 4WA." She tossed her pretty head and swept her 4RB hair from her eyes. "You are not 4AZ enough" she scoffed, "My love is 4BN. In the race to success you are but a 4DO." "The prospects are not 4PG for me" he sighed and rising began to 4AC way. "What tram do you catch? she teasingly asked. "4BWroo," he despairingly replied. "Well if you like I'll let you take me to a dance to- 4RK" she said, "but mind if you 4AW with another girl or sit out in a shady 4AT then it is all off." "That's 4PJ piece of spite" he angrily flung back and disappeared into the darkness. "Well I am no longer the 4HG of his bell I can see" she moaned and fell backwards into the cruet!

KEY:

4LJ — Feenaghty	4WA — Young
4SM — Ikin	4RB — Browne
4CR — Rich	4AZ — Sharpe
4CG — Gold	4BN — Cooling
4YN — Harkin	4DO — Hobler
4RK — Knight	4PG — Golden
4KY — Coffey	4AC — Walker
4HB — Baker	4BW — Couper
4DC — Cribb	4RK — Knight
4BD — Grimes	4AW — Walz
4JG — Grant	4AT — Bauer
4CG — Gold	4PJ — Jessop
4AK — Milner	4HG — Bell

This clever play on calls, names and words was published in the December 1927 issue of *QTC*. The writer's call sign is not listed in any official call book of the era, so it can be assumed he wished to remain anonymous — perhaps fearing the wrath of his fellows for fooling around with their call signs. Either that, or OA4PM is a misprint.

—Contributed by Alan Shewsmith VK4SS

"Must go OM — Evening meal is ready."

—VK2COP

Electro-Magnetic Compatibility Report

Hans Ruckert VK2ACU
EMC REPORTER
25 Berrille Road, Beverly Hills, NSW 2209

I am grateful to DL1BU for making the following paper available. This expert on EMC problems and field strength measuring methods and equipment describes the RF field we have to expect within a typical amateur radio station, our house and the neighbourhood. We see clearly the necessary immunity level appliances should have, so that for example television sets must be immune to direct RF pick-up by the chassis. The electronic entertainment industry has had more than 30 years to undertake voluntarily the necessary design steps. When about 10 years ago EMC standards in the form of Test-Cell ("Jacky") field strength values for equipment chassis were discussed, 10 V/m was requested by the FTZ (DOC) and the DARC. Some companies achieved well over 30 V/m (EMC Report No 4), but others agreed only to 1 V/m so a compromise value of 3 V/m was adopted in West Germany. The 3 V/m is much better than the milli-volt performance found earlier, but this field strength requirement is too low in many cases. The problem is worst when there are multi-story home units with wideband antenna preamplifiers (illegal in West Germany, must have television bandpass filters), which are as high as the transmitter antenna. Increased distance from the neighbour's television set at ground floor level, a directive beam transmitter antenna over 15 metres high, aluminium foil under the tiled roof, metal fly-screens, earthing of the television antenna coaxial braid and a television set with better than 3 V/m immunity should make compatibility possible in most cases. Input high-pass filter and mains-line filter may then help also.

SENSITIVITY OF TELEVISION VIDEO RECORDERS TO RADIO FREQUENCY FIELDS

By Gunter Schwarzbeck DL1BU for EMC Symposium Wroclaw, Poland, August 1984**

Summary
Television Video Recorders are quickly becoming popular. Millions are in use in densely populated areas.

The sensitivity to harmonics of nearby transmitters will be reduced with low-pass filtering at the transmitter output. Any overload effects at the VHF-UHF-tuners must be reduced by inserting isolating transformers at the antenna input. In some countries specifications exist for this sort of immunity.

Unfortunately, the severe problem is direct field penetration into the video section which is sensitive to all frequencies from 1 MHz to almost 10 MHz.

(See "EMC Standards for VCRs in West Germany: Amateur Radio, August 1986, Page 17")

1 Susceptibility Measurement
Video recorders contain VHF-UHF tuners that have to be checked for active and passive behaviour. This means that the radiation power of the oscillators for the fundamental and the harmonics must be reduced to certain values (in Germany to 31 dB above one pico-watt (VDE 0872)). On the other hand, radio frequency currents flowing into coaxial or normal inputs/outputs must not cause interference up to defined values. The severe problem, however, is the influence of electro-magnetic fields in the HF range 1 MHz to 10 MHz, because within this frequency range is the video band for the reproduction of the stored television picture and the accompanying sound. While is some countries the intensity of an electro-magnetic field that may not influence the perfect operation of entertainment equipment or professional devices is legally defined (in Germany three volts/metre for all frequencies from 150 kHz to 150 MHz, except for the tuned receiving frequencies or intermediate frequencies), no limit has been set so far (1984) for the field strength that video recorders have to stand. A specification can be expected for 1985, and it is hoped that also 3 V/m will be decided upon, as otherwise trouble has to be expected from many radio frequency sources [illegible].

Measurement results with samples of the latest generation of video recorders (see Figure 3) show that this aim can be reached with simple shielding measures. It is state-of-the-art with standard video recorders of several manufacturers.

1.1 TEM Cell
The highest sensitivity is, with video recorders, at the moment of reproduction of a video tape. For testing the susceptibility (direct penetration of E-fields) a "TEM Cell" is generally used. There are different ways to build such a cell. Figure 1 shows a simple version consisting of two parallel line sections made of aluminium sheet.

The radio frequency generator (signal generator with up to 10 volts at 50 ohms) is connected to the input of the line while the output is terminated into a resistive load equal to the characteristic impedance of the conductor geometry. The length L should be three times the long dimension of the Device under Test (DUT), in this case the recorder. If corrections are to be avoided for the field strength disturbance by introducing the DUT, this should not be more than 1/6 of the conductor spacing h. Otherwise an E-field probe should be used to check the correct field intensity.

The field intensity in the gap between the sheet conductors will be

$$E_v = \frac{V\,cell}{h} \qquad (1)$$

From a certain frequency on there will be a VSWR (voltage standing wave ratio), usually starting at a few MHz that might require the measurement [illegible] actual field intensity with a probe. There will be a maximum frequency, depending on the dimensions, called "cut-off/ multi-mode frequency." Above this frequency, usually in the VHF range, fields must be generated with antennas. For the range in consideration here (1 MHz — 10 MHz) sufficient accuracy will be obtained with formula (1).

A better, but bulkier cell might be built be using three instead of two sheet conductors, thus approaching a coaxial line. The upper and the lower plates will be operated at ground potential and may be supplemented by a front and rear shield, while the centre conductor receives the RF voltage. In this way it is easier to approach 50 ohms characteristic impedance, and no radiation occurs that otherwise would have to be shielded and causes ripple of the voltage and field at higher frequencies. Only half of the total height can be used for the device, and only this dimension has to be considered for equ (1).

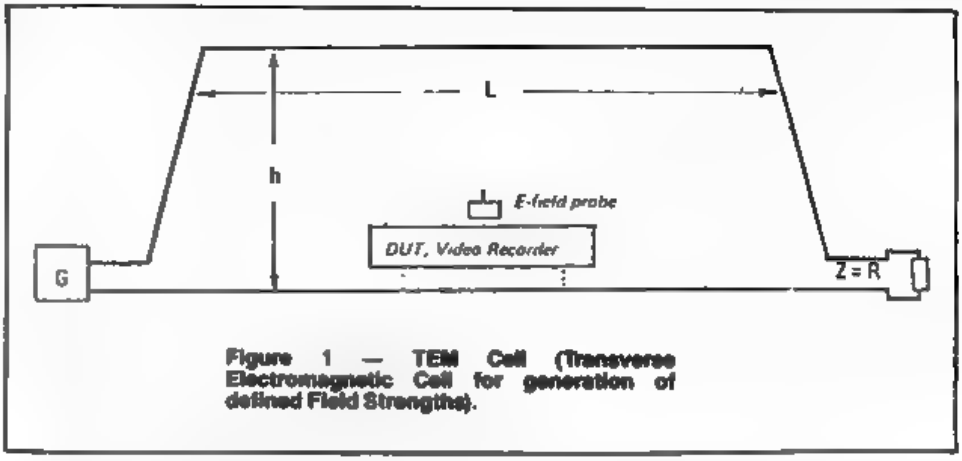


Figure 1 — TEM Cell (Transverse Electromagnetic Cell for generation of defined Field Strengths).

Modulation of Signal for Test
A certain modulation has to be agreed upon to obtain similar results. For other susceptibility tests on entertainment equipment, an amplitude modulated signal, 1000 Hz AM 80 percent is used and is also suggested for these tests. There are other proposals for 30 percent AM.

This AM signal will cause interfering lines on the television picture and will also be heard on the audio reproduction. It is not easy to define the point where the interference becomes objectionable. In these measurements described here, mainly the picture interference has been considered, and the first recognisable traces of a line structure have been used as a criterion.

It would of course be possible to define a certain "signal-to-interference ratio" to be measured in the picture and/or sound path, but the question would be disputed which ratio would be correct and if it can be used for any type of interference.

With a modulated signal, care has to be taken to specify the proper voltage. An RF meter which responds to the Average Value will not be influenced by the degree of AM.

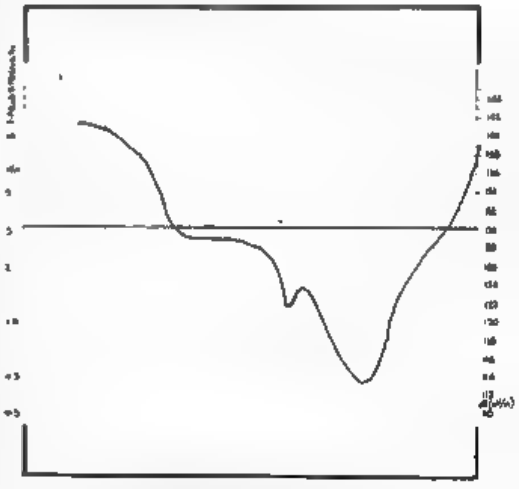


Figure 2 — Susceptibility Test of a Beta-type Video Recorder made in 1980. Cover material is plastic, no top screen. Measured in TEM Cell, 1 MHz-10 MHz. Horizontal line represents 3 V/m field strength that should at least be aimed at for compatibility with EM fields in populated areas. Dot-dash curve indicates field strength where the first traces of interference appears on a television screen. (AM, 80 percent).

An RMS meter will indicate a higher voltage with 80 percent AM (slightly more than 1 dB), and a peak-responding meter will go up by 5.1 dB.

The most often used diode detector RF voltmeter will transit from RMS response in the milli-volt ranges to almost peak in the volt range. The calibration is RMS sine wave, of course.

As such diode voltmeters are used quite often, the following table will show typical results:

10 mV range: 80 percent AM causes an increased indication over the carrier by	1 dB
30 mV range:	1.2 dB
0.1 V range:	2.6 dB
0.3 V range:	3.8 dB
1 Volt range:	4.4 dB
3 Volt range:	4.7 dB
10 Volt range:	4.8 dB

As only higher voltage ranges have been used (three volts range up), no corrections have been made here for the following measurements. Instead the true indication (that approaches the peak value) of a high-grade RF voltmeter has been used.

Figure 2 shows the curve of field strength, 1 MHz — 10 MHz, that caused the first traces of interference on one of the first commercially available video recorders of the "beta" system of 1980. The cover is made of plastic material, so only some internal shielding was effective. This recorder was very sensitive to signals with AM or SSB (single sideband) modulation from 3.7 MHz to 7.5 MHz. This might lead to severe trouble if shortwave transmitting stations are not too far from the recorder in the display mode. There is even some sensitivity to local broadcast stations. A broadcast transmitter using a quarter-wave vertical antenna with a power of 100 kW will cause a field intensity E vector of just 3.12 V/m in one kilometre, so coming close to the suggested immunity for video recorders of 3 V/m in the frequency range 1 MHz to 30 MHz.

Field intensity, caused by a quarter wave vertical:

$$E = \frac{312\sqrt{P}}{r} \quad (mV/m, P = \text{power in kW}, r = \text{distance in km}) \qquad (2)$$

or

$$E = 79.9 + 10 \log P - 20 \log r \ [dB\ \mu V/m] \qquad (3)$$

(P = power in W, r = distance in km)

A better shielding would not only be desirable to avoid unnecessary interference from shortwave transmitters (amateurs, police, embassy), but also from pulse interference of a broadband nature that exists in every house from switches and thermostats, etc. The philosophy often heard of that in a very few cases additional measures might be taken by the manufacturer of the recorder, is very dangerous, because it might just be impossible to cure the trouble by additional measures at the recorder. This method might be justified with television interference, where an isolating transformer at the VHF-UHF input might help. Should the embassy close their shortwave service or shall the user of an insufficiently shielded recorder buy a new model?

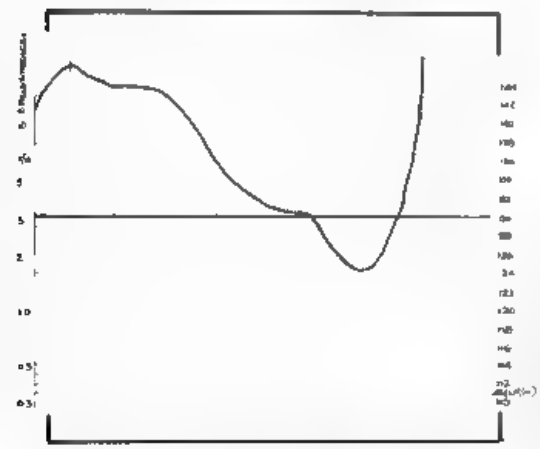


Figure 3 — Susceptibility Test of a VHS-type Video Recorder made in 1984. Cover material is metal with four screws. Measured in TEM Cell, 1 MHz-10 MHz. Horizontal line represents 3 V/m field strength that should at least be aimed at for compatibility with EM fields in populated areas. Dot-dash curve indicates field strength where the first traces of interference appears on a television screen. (AM, 80 percent).

Figure 3 shows a new recorder, manufactured 1983/84 of the VHS-type. The immunity is by far better than the 1980 model. The newer one uses metal shielding all around the set with four screws connecting the cover to the base. The curve in Figure 3 remains above the 3 V/m limit with only a small range being below from 4 MHz to 6.3 MHz. So the often used amateur bands near 3.7 and 7.1 MHz are much better rejected. In addition to the curve of Figure 3, a few discrete frequencies caused audio interference above 10 MHz.
10.4 MHz (19 V/m), 13.1 MHz (12.5 V/m), 14.1 MHz (8.3 V/m), 15.6 MHz (6.3 V/m), 21.15 MHz (3 V/m), 31.1 MHz (0.1 V/m), etc. The reason for this audio interference has not been checked further as with the exception of 31.1 MHz all other field strengths for just audible interference were ≥ 3 V/m.

The sensitive parts in the video recorder are the magnetic head and the video-frequency amplifier. In this better model, some screening around this head was used. With proper EMC checks and only little more shielding, all of the field-strength curve of Figure 3 might be moved up to 3 V/m or more.

The frequency spectrum used in a video amplifier is shown on the screen photograph of Figure 4.

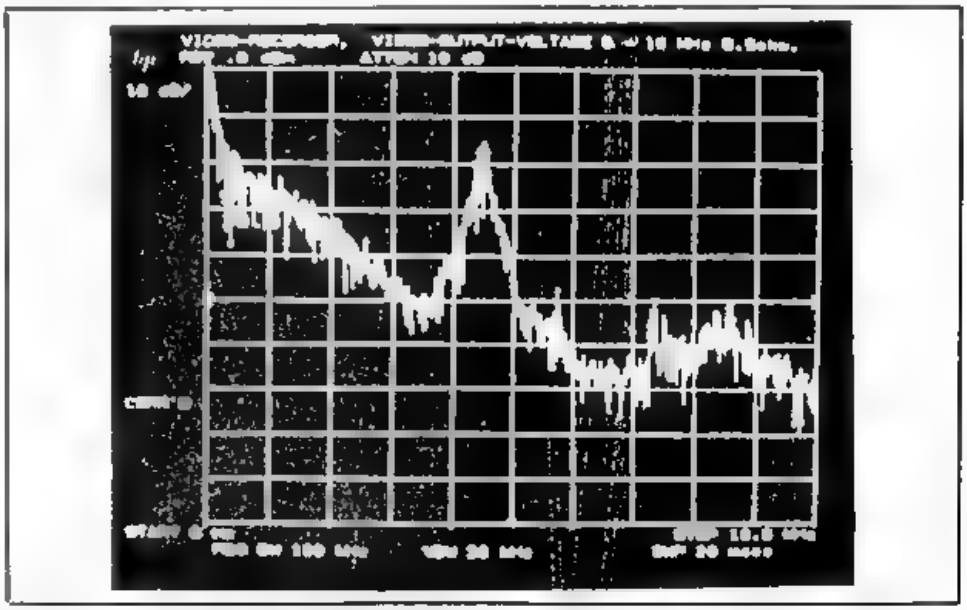


Figure 4 — Spectral Frequency Output of a Video Recorder (VHS- type, 1984), 0-10 MHz (1 MHz/div), (10 dB/div), normal picture.

2. Measures to Reduce Interference

For the severe problem of direct penetration of radiation into the video section, the usual shielding measures have to be followed. Also filtering of DC leads or signal path might help.

Figure 5 shows how conducted interference currents from a well shielded input wire or cable can reach internal boxes. Everything is completely shielded, but nevertheless the RF voltage drop across the ground wire of box C inside box B will reach box D and cause interference. The problem is at the feed-through A where the braid of the shielded cable is not connected to the outer shielding box B. If this connection is perfect (coaxial grounding), all RF currents would remain on the outer surface of box B and would not do any harm to the sensitive inner boxes with amplifiers, etc.

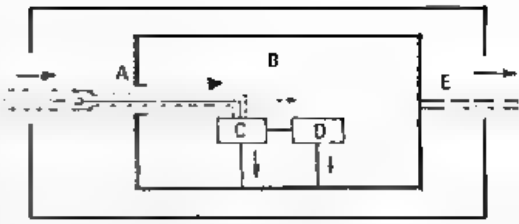


Figure 5 — Shielded Box B with input coaxial cable penetrating at A (insulated), grounded at lower side of sub-box C with RF current reaching box D.

2.1 Avoiding RF Currents on Connecting Cables

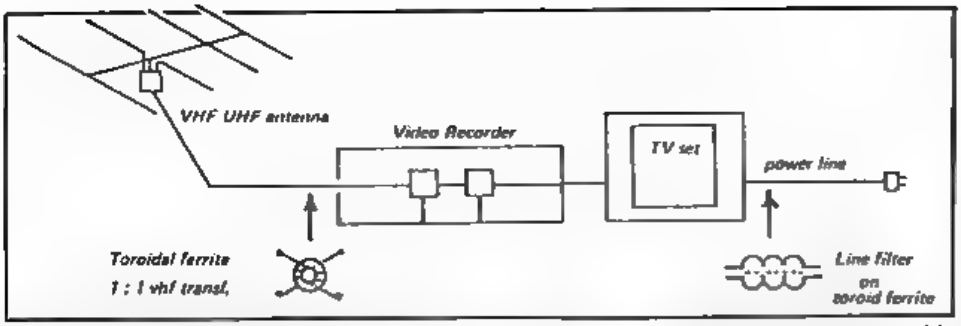
A VHF-UHF antenna with a long coaxial cable down-lead connected to the VHF-UHF tuner input, together with the power line cord of the recorder, also the connecting cable from the recorder to the television set and its power line cable represent a very efficient shortwave antenna system, similar to a dipole of considerable length or a grounded antenna. This means that high RF currents at the centre of this "dipole" might flow into the recorder or television set. To avoid these currents that might do similar harm as the fields, an isolating VHF-UHF toroidal ferrite transformer should be used at the tuner input.

Figure 6 shows the point where such a small ferrite bead with three bifilar turns of enamel copper wire should be inserted (if not already built into the antenna input of the recorder). Only the small capacity of the two windings bring RF currents of shortwave frequencies into the recorder. Furthermore, such a transformer with low inductance windings acts as a high- pass filter with low attenuation for the wanted VHF-UHF signal and high attenuation for lower frequencies. Also currents through the power line cord (common-mode RF) should be avoided by inserting a somewhat larger toroid with two parallel wires (right-hand side of Figure 6).

Of course — if the coupling of a transmitting antenna with the television system is too tight, there will be no solution for the interference problems. For that reason, also the transmitter needs an effective power line filter, a coaxial cable with no RF current on the outer shielding and sufficient distance of the radiating antenna from the television system.

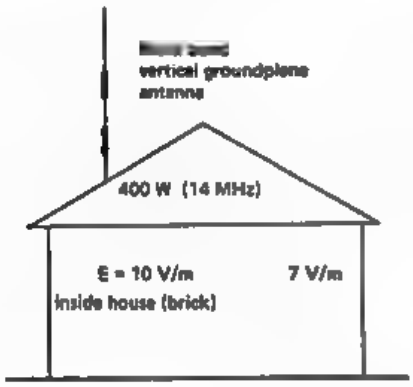
The order of field intensity generated by shortwave transmitting antennas, fed with power of 10 watts and 400 watts may be seen in Figures 7 to 11. If 100 watts are used instead of 400, the field strength will be half the figure shown.

All the values shown are measured, mostly 1.5 metres above ground. Both ground effects and the near-field effects cause different fields to exist compared with calculations. It is obvious from



these magnitudes of field intensities that severe problems could arise if shielding and filtering are insufficient in any type of equipment. The case of the video recorder is only one of innumerable other examples of EMC, and it is good advice to start solving these problems as early as possible. Otherwise millions of "cases" will have to be solved individually.

Figure 6 — VHF-UHF antenna and cable acting as a dipole antenna for HF fields together with power line conductor. RF current will flow into the video recorder unless cable shield is concentrically connected to outer shield. The dipole should be "broken" at the antenna side by an isolating transformer. Also use line filter.



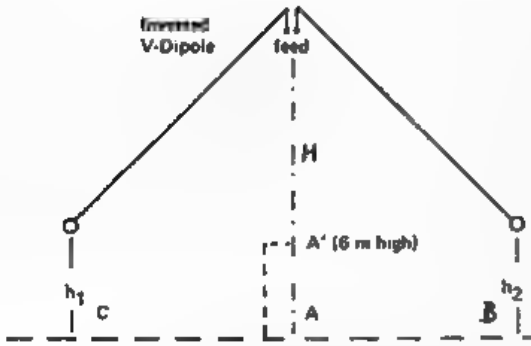
20 m distance E = 15 V/m

40 m distance 6 V/m

(measured 2 m above ground of medium conductivity)

(with 100 W : half the field strength)

Figure 7 — Field Strength underneath a transmitting station with a vertical ground plane antenna with radials, also in 20 and 40 metre distances.



Case a. 7 MHz, 400 W, two legs 10 m each, H = 16 m, $h_1 = h_2 = 10$m
Field at A: 20 V/m, at B : 30 V/m
in 20 m distance, 60° outside antenna plane: 6 V/m

Case b. 3.5 MHz, 400 W, 2 legs 20 m each, height 29 m, h_1=15 m, h_2 = 10 m
E-Field Strength
at A: 4 V/m
at B: 36 V/m
at A' : 30 V/m
at C : 20 V/m

Case C: 3.5 MHz, 400 W, 2 legs 20 m each, H=16 m, $h_1 = h_2$ =4.5 m
Field at A: 24 V/m, at B and C 180 V/m(!)
Case d: 1.8 MHz, 10 Watts, H=29 m
h_2 = 3,5 m, Field at A 1 V/m, at B 30 V/m

Figure 8 — Field Strength underneath an inverted Vee dipole antenna, fed with 400 watts (10 watts) at different locations in the near-field-zone (measured at two metres above ground).

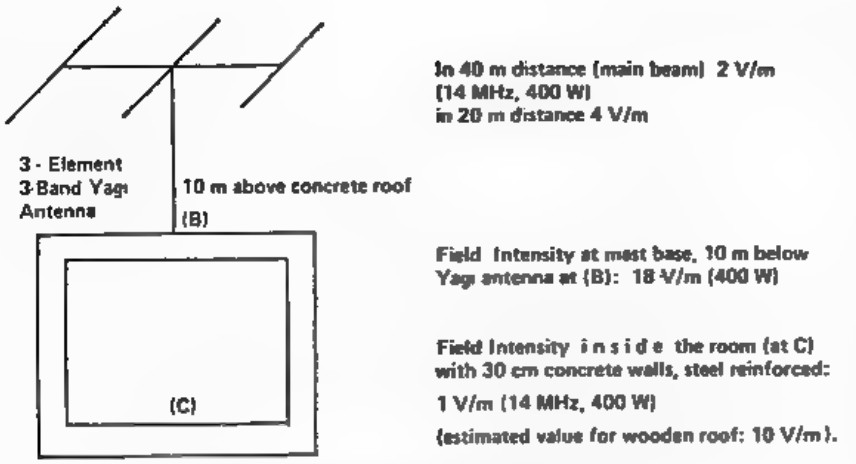


Figure 9 — Field Strength of 400 watts at 14 MHz in front of and underneath a three element Yagi antenna.

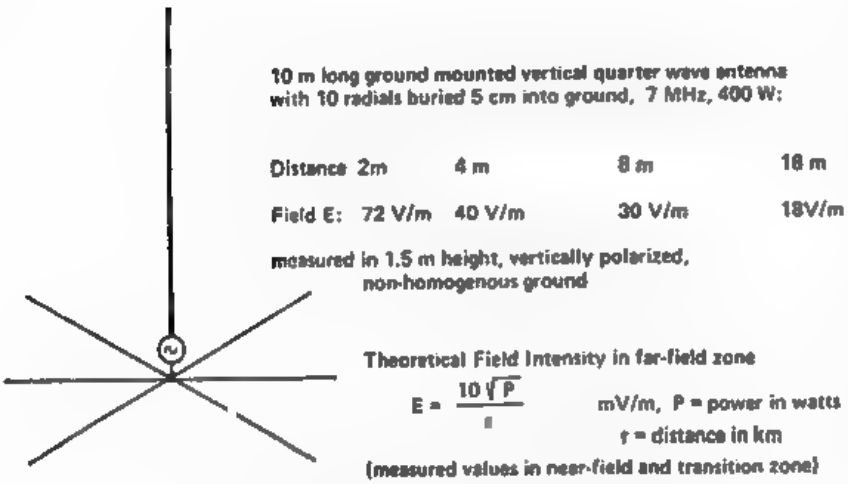


Figure 10 — Field Strength of 400 watts at 7 MHz into a ground-mounted quarter-wave antenna.

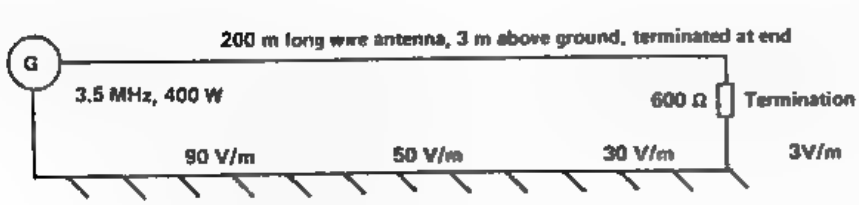


Figure 11 — E-field 1.5 metres above ground underneath a 200 metre long wire antenna.

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Development of EMC equipment, measurements,
Also consultant for DARC Radio Amateur Club — Honorary Technical Officer

THOUGHT FOR THE MONTH

The more things change the more they are the same.

WHY AN AMATEUR IS CALLED A "HAM"

Have you ever wondered why radio operators are called "Hams"? Well, it goes like this — the word Ham was applied in 1908 and was the call letters of one of the first amateur wireless stations, operated by some members of the Harvard Radio Club. The operators were Elbert S Hyman, Bob Almy and Peggy Murry. At first they called their station Hyman-Almy-Murry. Tapping out such a long name in code soon called for a revision and they changed it to HY-AL-MU using the first two letters of each name.

Early in 1909, some confusion resulted between signals from amateur wireless HYALMU and a Mexican ship named HYALMO, so they decided to use only the first letter of each name and the call became HAM.

In the early pioneer unregulated days of radio, amateur operators picked their own frequency and call letters. Then, as now, some amateurs had better signals than some commercial stations. The resulting interference finally came to the attention of congressional committees in Washington and they gave much time to proposed legislation, designed to critically limit amateur activity.

In 1911, Albert Hyman chose the very controversial Wireless Regulations Bill as the topic for his thesis at Harvard. His instructor insisted that a copy be sent to Senator David I Walsh, a member of one of the committees hearing the bill. The Senator was so impressed he sent for Hyman to appear before the committee. He was put on the stand and described how the little amateur station was built and he almost cried when he told the crowded committee room that if the Bill went through, they would have to close the station as they could not afford the licence fees and all other requirements which were in the Bill.

The debate started and the little station, HAM, became a symbol of all the little amateur stations in the country crying out to be saved from menace and greed of the big commercial stations who did not want them around.

Finally, the Bill got to the floor of congress and every speaker talked about the poor little station HAM.

That is how is started. The whole story may be found in the Congressional Record. Nationwide publicity associated station HAM with amateurs and from that time to possibly the end of time in radio, an amateur is a "Ham".

—From *Westlakes Amateur Radio Club Monthly Newsletter*, September 1986

LIGHT ACROSS THE NULLABOR

O Telecom has begun route selection work on an optical fibre link across the Nullarbor between Perth and Adelaide.

Telecom's national optical fibre program to connect all Australian mainland capital cities by 1992 will cost $300 million.

A Melbourne central business district optical fibre loop became operational in November this year. The $3 million pilot program provides a street network which passes about 60 identified major business houses.

The loop will initially provide a test bed for Telecom's development of both commercial approaches and technical methods. It also offers opportunities to Australian industry for development of a range of new equipment and systems.

A similar street system is being considered for Sydney's central business district.

—From *electronics news*, September 1986

PHONE CAPACITY QUADRUPLED

O A new speech coding algorithm that can quadruple the voice-channel capacity of standard telephone systems has been developed.

Subjective listening tests have demonstrated that the developed algorithm, which encodes speech signals at a rate of 16 Kbps, produces voice quality nearly distinguishable from that of the current industry-standard rate of 64 Kbps.

Substitution of the algorithm for the standard algorithm makes available four times as many telephone channels for use in either cable or radio communication systems.

—From *electronics news*, September 1986

Spotlight on SWLing

Robin Harwood VK7RH
52 Connaught Crescent, West Launceston, Tas. 7250

Well, another year has commenced — 1987 is here, which reminds us that the 21st Century is only 14 years away! That is truly a sobering thought. I am not going to be a prophet and make any predictions of what may transpire during the next 12 months. I will just sit back and observe what happens.

As one gets older, time literally does fly. The same is true in relation to happenings on the shortwave bands. Although it may give the impression that nothing is changing, yet the reverse is the case, for there is always something new or unusual observed. With the proliferation of new modes and special technology, it is difficult to keep abreast of the changing scene. It is different today from what the state-of-the-art was in 1972, some 15 years ago.

Some of the old timers wistfully remember the days when senders were restricted to lower power levels and the bands were less congested. Or they remember the days of listening from distant outposts, when station personnel were much more friendly and approachable. Nowadays, some of the larger, as well as the smaller, broadcasting organisations do not pay much attention to their audience and concentrate on airing reams of useless information and propaganda, ignoring listeners comments and feedback. They are puzzled why their research indicates that their audience-share is dropping.

As I have been listening to shortwave for 30 years now, I have recently been evaluating the alterations that have happened over the years. I think the programs that really brought the listeners and broadcasters together were the letterbox segments, such as on Radio Australia with Keith Glover, Earle Fisher on Radio Canada International and Margaret Howard on the BBC World Service. When these segments were discontinued, the listeners lost a personal contact with the station, which was subsequently apparent in the station's impersonal attitude from that time.

Also, there is a lack of glamour or fascination about international and shortwave stations today. This is not surprising as the growth of television has taken away the allure and excitement of listening to the news direct from the source, when they can see it happening almost instantaneously on the "box".

Yet, I am still interested and fascinated by what I hear, tuning across the bands. It may be a Mayday call from a vessel in the Pacific or copying a RTTY broadcast from a Middle Eastern newsagency. Or listening to the variety of different ethnic music that is available, compared with the drab staple that is churned out from our domestic stations.

If I am disenchanted with anything on HF, it is the average amateur QSO. We no longer have the intimate camaraderie that we had with QSOs 15 to 30 years ago, or even longer. Now it is hello OM, you are 20 over nine here and is my audio okay, etc. And please QSL thru QSO for the Worked All signals award or something similar. Personally, I think that there are too many awards and that their criteria is too easy. To me, an award has to be earned the hard way. It is a sense of achievement. 30 to 50 years ago, it was a comparative rarity for an amateur to notch up 100 countries and to get the required number did take time. Nowadays, there are [illegible] who have achieved that milestone in six weeks. I know of one DX operator who amassed 300 or so countries in two years and is only operational when one of the rarer prefixes [illegible].

When these rare DXpeditions are about the bad manners and sloppy operating procedures adopted by the average amateur is certainly no endorsement of the hobby. And some of the locations for these forays is also open to question. To mount a DXpedition to an outcrop of rock, which is only out of the water at low tide, at tremendous expense, even human lives being put at risk, all for the dubious honour of giving an amateur a piece of cardboard to help him get a worthless certificate, which proves little or nothing to the average man-in-the-street.

Perhaps that is why I am somewhat disillusioned with the present state of the hobby, combined with the fragmentation of the hobby into many specialist areas and groups that increasingly concentrate on their narrow interests.

I hope that I have not sounded too pessimistic about the amateur radio scene, but truthfully that is how I perceive the hobby at present. That is why I do derive more pleasure in tuning around the entire HF spectrum instead of being confined to one allocation. One does have to take in the wider perspective, the overview of things.

I think it is very appropriate to voice these comments at this stage, with New Year Resolutions fresh in our minds. We should have a goal to work towards and when we get close to it, we get a sense of achievement of having accomplished our goal. As a matter of fact, my goal this year is to be more consistent in dispatching reports to the various authorities that have requested help with their signals. What goals do you have in 1987?

73 de VK7RH

Club Corner

TWIN CITIES RADIO AND ELECTRONICS CLUB

The Twin Cities Radio and Electronics Club, VK2EWC, announce the following office bearers following the recent AGM

President: Rod Adams VK3CBO
Vice-President: Kevin Hartnett VK2FUO
Treasurer: Greg Sargeant VK2EXA

Business meetings of the Club are held on the second Monday of the month at 0730 pm, and two workshop nights are held each month, the third and fourth Mondays at 0730 pm, 644 Elm Street, Albury.

Net nights are conducted on Mondays, 28.490 MHz USB, 0930 UTC.

Further information about the Club may be obtained from PO Box 396, Albury, NSW, 2641.

Contributed by Peter Presutti VK2CIM, Secretary

BALLARAT AMATEUR RADIO GROUP

The Ballarat Amateur Radio Group held their annual Hamvention on Sunday November 2, 1986.

More than 300 amateurs and their families packed into the venue to see an outstanding display of equipment and activities. One of the displays was the AUSSAT Dish and equipment which gave an excellent picture on the downlink. Packet radio was also very popular and a huge range of pre-loved components and equipment provided a temptation for many. The Icom trade stand displayed a huge range of new gear at very special prices, just for the day.

Fox hunts and scrambles were again popular with many amateurs. The winner of the events trophy was VK3CGH. Clarry VK3DMK, won the high-speed CW event and the best home-brew equipment prize went to VK3CGG. The winner of the VZ300 computer raffle was Tom VK5EE, whilst Jim VK3NK won the ladies hamper.

From the glowing reports heard on air, it was the amateur event of the year with visitors from C21, VK2, 3, 5, and 7. It was great to see 12 members of the Disabled Radio Group amongst their fellow amateurs.

The BARG ladies turned on another top-line lunch and free tea and coffee flowed all day.

If you missed this great days outing you missed seeing the great spirit of amateur radio at its best. See you at Hamvention-1987!

Contributed by Kevin Hughes VK3WN, Hamvention Convenor

SYDNEY AMATEUR DIGITAL COMMUNICATIONS GROUP

The Sydney Amateur Digital Communications Group has announced the release of their SADCG Digital Repeater software, version 2.1, for amateur packet radio. This release features full implementation of AX25 digipeating, making it the first 'multi-protocol' packet repeater.

The first amateur packet repeater in Australia used the original version 1.3, developed and supplied by John Vandenberg VE3DVV, which, at that stage, only supported Vancouver V1 protocol and provided functions for V1 users. The DR software progressed to version 1.5, where it was superseded by version 2.0, to coincide with the release of Vancouver V2 protocol.

With version 2.1, it is now possible for both Vancouver and AX25 users to operate on the same channel simultaneously without interference. The explanation behind this is that with Vancouver protocol, all frames are repeated by the DR unless the user supplies a LOGOFF command, which allows the user to send packets without going via the DR.

The concept with AX25 protocol is the reverse. The AX25 user is not repeated via the DR unless the AX25 user specifically puts the DR's call sign into the user's AX25 address field. This means a SADCG DR can be installed as part of an AX25 digipeating chain.

The SADCG DR does provide user commanded functions, which can be called by Vancouver protocol users, while in the unconnected mode, (that is, when a packet node is not connected/linked with anyone) the functions include Time, Status, Log, Logon, Logoff, Clear, Save, Dump and Help.

Other features provided for Vancouver protocol users are automatic DR identification messages, which display Time, Call Sign, and Location. This occurs every five minutes while the DR is in use, otherwise the DR is in quiescent mode when there is no channel activity.

These DR command functions are not provided to AX25 protocol users, as none of these features are used in TAPR AX25 digipeating. The figure shown is a file capture on packet which I have edited and included comments.

The SADCG DR software is only supplied to amateur radio groups who operate, or intend operating a licenced packet Digital Repeater and is presently only available for use on VADCG (Vancouver) Terminal Node Controllers (TNC).

Figure 1.

```
'(this is a file capture of Digital Packet Repeater VK2RMB, on 144.800 MHz on
July 5th, 1986 by VK2KFJ using Vancouver V2 protocol.)

TIME                                                        (user invoked command)

TIME :13 37 41
Repeater node: VK2RMB  at Terrey Hills. Sydney.

HELP                                                        (user invoked command)
Command Summary.
TIME      display time
LOG       shows log status
LOGON     station repeat enable                  (Digital Repeater commands
LOGOFF    station repeat disable                  available to users. Each
STATUS :  show repeater status                    command is followed by a
CLEAR :   clear tx/rx buffer                      CR or CR/LF.)
SAVE :    save tx/rx buffer
DUMP :    dump buffer (256 byte blocks)

LOG                              (user invoked command)   (E5B0 represents the
Node E5B0 logged on                                        2 byte node address
                                                           for VK2KFJ, derived
LOGOFF                           (user invoked command)    by using a poly-
Node E5B0 logged off                                       nomial equation in
                                                           Vancouver protocol..
LOG                              (user invoked command)
Node E5B0 logged off

LOGON                                                       (user invoked command)
Node E5B0 logged on

STATUS :                                                    (user invoked command)
TIME :13 38 32  DAY :195  DATE :Jul 05, 86
Repeater      : VK2RMB
Status        : enabled
Last failure  : N/A                                         (status of the
Failure day   : N/A                                          Digital Repeater.)
Error code    : X
Error log     : 00 00 00 00 00

VK2KFJ                           (automatic identification provided by my TNC.)
SAVE :                                                      (user invoked command)
Environment saved, use "DUMP :" to display.

DUMP :                                                      (user invoked command)
7000:00800000 0D140000 0080E5B0 00000000  7000:................
7010:1E521153 22530000 25531053 11530000  7010:.R.S"S..%S.S.S..
7020:02C0FA00 000004C8 1400FFFF 00000000  7020:................
7030:00000000 00000000 00000000 00000000  7030:................
7040:03000506 03000506 03000300 70FCFA05  7040:............p...
7050:B0031D00 01000400 05060100 05066808  7050:..............k.
7060:70FC1D00 6B0B0000 45070000 29090201  7060:p...k...E...)...
7070:20737461 7475730D 0A4800FF FF65B003  7070: status..H...e..          (HEX/
7080:01004C4F 474F4E20 20202020 73746174  7080:..LOGON      stat          ASCII
7090:696F6E20 72657065 61742065 6E61626C  7090:ion repeat enabl           dump.)
70A0:650D0A4C 4F474F46 46202020 20737461  70A0:e..LOGOFF    sta
70B0:74696F6E 20726570 65617420 64697361  70B0:tion repeat disa
70C0:626C650D 0A4300FF FF65B003 01005354  70C0:ble..C...e....ST
70D0:41545553 203A2020 73686F77 20726570  70D0:ATUS :  show rep
70E0:65617465 72207374 61747573 0D0A434C  70E0:eater status..CL
70F0:45415220 3A202020 636C6561 72207478  70F0:EAR :   clear tx
======   end of dump  ( repeater node : VK2RMB )  ======

TIME :13 40 00                                              (automatic 5 minute I.D.)
Repeater node: VK2RMB  at Terrey Hills. Sydney.
```

SK001

SK070

SK080

POWER ENTRY MODULES

Westinghouse Systems have extended their range of Schaffner Power Line Filters, Suppression Chokes, Pulse Transformers, etc, with a new product, Power Entry Modules.

The SK070, is complete with a IEC320 C14 plug, fuses and voltage selector, nominal 6 amps current.

SK080 connectors have an IEC320 C14 plug, fuses and one or two pole power supply switch. Nominal currents are four and six amps.

SK001 — SK004 connectors have IEC320 C14 plug, fuses, nominal current 10 amps.

All connectors can be equipped with one or two fuses (5 x 20 or 6.3 x 32)

For further information contact Westinghouse Systems, 80-86 Douglas Parade, Williamstown, Vic. 3016. Telephone (03) 397 1033.

HEATHKITS

If there is one name known the world over for quality in electronics it is *Heathkit*.

For more than 50 years, the Heath Company of Benton Harbour, Michigan, has given hobbyists and enthusiasts build-it-yourself kits which are at least as good — and sometimes much better than — commercially available models.

More than that, and possibly what has given Heathkits their name, is the highly detailed, step-by-step construction manuals that Heath meticulously prepare for each kit.

Add to this the huge range of kits — everything from AM transistor radios through all types of test equipment, right up to the amazing Hero Robot. Kits for the home, the car, for education, amateur radio . . . you name it, there is one in the Heathkit range.

Until now, Heathkits have been readily available through most of the western world — except Australia.

Dick Smith Electronics has recently been appointed Heathkit Distributor for Australia and New Zealand.

Initially, some 20 kits have been selected as "off-the-shelf" lines in major Dick Smith Electronics stores (some stores may have to order for you).

Of the other hundreds of products in the Heathkit catalogue, Dick Smith Electronics will order (on an indent basis, against a firm deposit) direct from the USA. Some kits are obviously not suitable for Australia (such as NTSC colour televisions, etc), and other kits are not available for licensing reasons (such as computers).

Heathkits are not cheap, but then nothing of top quality ever is! When you buy a Heathkit, you are buying the best kit available — a kit of which you will be proud to say "I built it myself!"

For further information contact Wendy Giles, Public Relations Manager, Dick Smith Electronics Pty Ltd, PO Box 321, North Ryde, NSW. 2113. Telephone: (02) 888 3200.

Intruder Watch

Bill Martin VK2COP
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

Well, here we are in a brand new year, and if we are positive thinkers, we see the coming 12 months as "a whole new ball-game" in which we can try and omit some of the mistakes of the previous 12 months. We can try and achieve some of those objectives that we have, in previous years, put off until next year! As I am a kind of "semi-positive thinker," I reserve the right to still make a few mistakes in 1987 irrespective of which category you belong to, I wish you all a very happy and satisfying new year.

At the time of writing, the DX seems to be improving a little. By the time the column is published, it may well be apparent that the new solar cycle is heading up. I hope so. Wouldn't it be nice if the DX got better, and the number of intruders diminished? Speaking of intruders, the reports for September 1986, broke-down as follows: Those using A3E mode — 334; CW intruders — 149; Non-amateur RTTY — 54; Intruders using other modes — 48; and 18 had the gall to send their call sign. The following people were a great help to the IW for that month: VK2s AEV, BAG, DEJ, EHQ, G Bradford; VK3XB; VK4s AKX, BG, BHJ, BTW, KGE, KHZ; VK5s AJK, GZ, NTT, TL, VK6s JQ, RO, XV; VK7RH and VK8s JF and HA. Thanks a lot fellers, and hope you can help again this year.

SARTS (Singapore Amateur Radio Transmitting Society) has agreed to join with the WIA, JARL and NZART in monitoring intruders in IARU Region 3. This is a step in the right direction and we hope for their continuing support.

Col VK4AKX, observes that the main intruders are still Voice of the Straits (VoS) from China on 3.535 MHz; Urumqui from China on 7.050 MHz Radio Tirana from Albania on 7.065 7.080 and 7.090 MHz, Radio Beijing (China) on 7.095 MHz and RRI (Indonesia) on 7.098 MHz. China and Albania continue to vie for the IW Wooden Spoon Award. I think we may have a tie there.

Look for the IW Net on/or about 3.595 MHz on Wednesday evenings at 1000 UTC. (Half-an-hour earlier in daylight saving time).

Our VK7 Intruder Watch Co-ordinator, Robin VK7RH, has a new QTH — 52 Connaught Crescent, West Launceston Tas. 7250, or see the top of his *Spotlight on SWLing* column.

Good news re the Asian transmissions on the lower end of 28 MHz comes to me from Hong Kong. In August 1986, a meeting took place in Hong Kong, which resulted in the news being passed to me that the Hong Kong Amateur Radio Transmitting Society (HARTS) and the Hong Kong Administration are co- operating in their efforts to minimise the interference to amateur operators on the 10 metre band. Although the problem is extensive, hopefully the concerted efforts of HARTS and the Hong Kong Authorities may be able to help us.

Ivor VK3XB, has been reporting signals, which he describes as "the blowfly" on 1.802 5, 3.530. 3.645, and 7.054 MHz. Ivor describes it as sounding like a spark transmission, with a single two-second dash, tone- seven, with a CW modulation of didahdidahdidahdidah. *Anyone know anything about this one?*

Let me know if you have heard it. So that is about all for this month. . see you in February, take care and enjoy the hobby!

VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW 2150

Happy New Year to all amateurs and may it bring you better DX in the coming 12 months.

A new year for the Division means preparation for the Annual General Meeting. Although it is four months down the track as these notes were being prepared, we have to start thinking about it. First, those on annual billing will have received their renewal notices which become due on January 1. Please process it as soon as practical.

To those groups and office bearers who have to complete any financial notifications to the treasurer, please submit your paperwork now as the year closed on December 31 and the books are now being prepared. Next, those who have reports to submit for the annual report should have these in by mid- January. Nominations for Council for the next term will be called during February. Nomination forms are available from the Divisional Office.

The Council consists of seven members. The Annual General Meeting will be held at the end of March, most likely on the 28th.

Further details will appear in next month's notes.

It is also the time of the year to consider and submit to Divisional Council, matters which may be suitable for raising at the Federal Convention, which will be held in Melbourne, in early May. Sufficient lead time needs to be given to allow discussion by all interested parties.

EXAMINATION DATES

A reminder that the February examination applications close on January 8.

PUBLICATIONS

A reminder that when the Office reopens in January, there is, as always, a range of amateur publications available. There are still stocks of the *Australian Call Book*.

During the month, limited stocks are expected of the m f International and *USA Call Books*, together w th the *1987 ARRL Handbooks*. A new list of surplus items available may be obtained from the Office in person or by sending in a stamped self addressed envelope.

NEW MEMBERS

A welcome is extended to the following who were in the November intake:
S Anderson Assoc, Cabramatta; A Brett VK2KBA, Garden Suburb; F W Brown VK2KFW, Albion Park; T J Burkart VK2YGQ, Point Clare; T I Clarke VK2YCB, Taree; G A Collins Assoc, East Maitland; D C J Croxford Assoc, Faulconbridge; C N Davis VK2KNN, Charlestown; B L Dyne VK2MLD, Gorokan; P D Harris Assoc, Lavington; R K Harris Assoc, Lavington; D E Henry VK2MAP, Wauchope; L T Noonan VK2LEE, Scone; J M Ried Assoc, Evans Head; R R Ross- Wilson Assoc, Leichardt; J A Sulsau VK2VSJ, Marsfield; A J Walter VK2ZJW, Tamworth; Z R Yacoub VK2KCZ, Dundas; M J Yorkston Assoc, Padstow.

INSTRUCTION CLASSES FOR 1987

Would the various clubs and groups who will be conducting classes during 1987, please advise the Divisional Office with the details.

The Division is often the first point of contact for prospective new amateurs who are looking for a local class that they can attend. The Division's Correspondence Course may be undertaken at anytime, anywhere. Details from the Office.

Gladesville ARC, who conduct their classes at Lane Cove, advise that they will be commencing a novice theory, leading into the full AOCP level from January 29, 1987 and a computer course for basics from February 10, 1987. Details from Ken VK2LT, phone (02) 516 1271

BROADCASTS/OFFICE HOLIDAY BREAK

The last broadcast for 1986 was held on December 21. The first broadcast for 1987 will be on Sunday, January 11. During this period, any major happening will be announced on the Divisional telephone News Report — (02) 651 1489.

The Office closed at 2 pm on Friday, December 19 and will reopen on Monday January 11. During this period, the mail will be attended to and should be sent to the address at the top of this column.

FEES

The VK2 fees for 1987 are:
Full Member — $34.50
Associate Member — $32.50
Pensioner — $27.50
Student and Family Rates on application to the Office.

Note there is no joining fee, despite what appeared on page seven of the current Call Book.

A reminder that the *Gosford Field Day* will be held on Sunday, February 22. ** Morse Machine, VK2RCW, changed two metre frequency late in 1986 to 144.950 MHz. The 80 metre transmission is on 3.699 MHz. It is a continuous service. ** Liverpool and District ARC Repeater, VK2RLD 7375, suffered a problem early in November when the guy wires on its host tower were interfered with resulting with a tower collapse. ** The communications division of SES Headquarters has been carrying out coverage trials from Dural on UHF. Should these trials provide the desired coverage, a commercial arrangement will be entered into between the Division and the SES.

TRADE AND TREASURE SALE

The next event is being considered for the end of this month. The Broadcast will provide details — a Sunday afternoon in the carpark at Parramatta.

DIVISIONAL LIBRARY

The Library is starting to build up a range of original and copies of equipment handbooks and service manuals. If you can assist with either the donation or the loan of these publications, we would like to hear from you.

A list of publications we already have will appear in the next issue. In the meantime, you might like to contact Aub Topp VK2AXT, the Librarian, at the Office any Tuesday. Telephone (02) 689 2417.

We are interested in any handbook for anything — WWII, early or current commercial units, etc. Any loans will be copied and returned to you. Thanks.

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Contests

Ian Hunt VK5QX
FEDERAL CONTEST MANAGER
Box 1234, GPO, Adelaide, SA, 5001

CONTEST CALENDAR

JANUARY

1	UBA SWL Competition (Continues to December 31, 1987)
5	Ross Hull Memorial VHF Contest concludes
23-25	CQ WW 160 metre CW Contest
31	YL ISSB CW Contest

FEBRUARY

1	YL ISSB CW Contest (concludes)
7- 8	QCWA CW QSO Party
14-16	YLRL YL-OM Phone Contest
20-22	CQ WW 160 metre SSB Contest
21-22	ARRL DX CW Contest
21-22	YL ISSB Phone Contest
28	YLRL YL-OM CW Contest

MARCH

2	YLRL YL-OM CW Contest
7- 8	ARRL DX Phone Contest
7- 8	QCWA Phone QSO Party
14-15	John Moyle Memorial Field Day Contest
28-29	CQ WW WPX SSB Contest

I would like to take this opportunity to wish all readers a very Happy New Year and may you have an enjoyable and successful contest year.

A reminder also, please remember to send in your logs for the Ross Hull Contest.

—73 de Ian VK5QX

HUNGARIAN DX CONTEST 1987

This contest is held on the third full weekend of January each year. In 1987, it will be held from 2200 UTC Saturday, January 17, to 2200 UTC, Sunday, January 18.

The contest's aims are to strengthen traditional radio amateur friendships, to prove technical and operating abilities and knowledge and to help participants to fulfill the conditions for various Hungarian diplomas. It is organised by the Hungarian Radio Amateur Society and is open to any licenced radio amateur.

Categories
Single operator, single band
Single operator, multi band
Multi operator, multi band (Club stations are only permitted to enter this section)

Frequencies 3.5, 7, 14, 21, and 28 MHz. Only one signal, on one band permitted at any time. This rule shall be strictly enforced. Disregarding this rule results in disqualification.

Mode CW only

Call CQ HA Test

Exchange Signal report and progressive serial number from 001. Hungarian stations will give an additional two-letter code/county as follows:
HA, HG1 — GY, VA, ZA; HA, HG2 — KO, VE; HA, HG3 — SO, TO, BA; HA, HG4 — FE; HA, HG5 — BP; HA, HG6 — NO, HE; HA, HG7 — PE, SZ; HA, HG8 — BN, BE, CS; HA, HG9 — BO; HA, HG0 — HA, SA.

Score HA, HG stations — 6 points; DX stations — 3 points; Own Continent — 0 points

Multipliers Number of Hungarian counties, per band

Total Score Sum of points multiplied by the sum of the total multipliers.

Logs Separate logs per band, plus a summary sheet with a signed declaration should be sent to the Contest Bureau, H-1581 Budapest, Box 86, Hungary, within six weeks of the contest.

AWARDS The top three entrants in each country, continent and category will be awarded certificates. The absolute winners of the categories SOMB and MOMB will also receive a plaque. The winner of the SOSB category will receive an memorial award.

Diplomas Foreign participants may also apply for the following awards: WHD, Savaria, Pannonia, Dunakanyar/DD, Balaton/BD, Budapest/BPA.

THOUGHT FOR THE MONTH

Yes and no are the oldest and simplest words, but they require the most thought.

VK3 WIA Notes

Jim Linton VK3PC
IMMEDIATE PAST-PRESIDENT
WIA VICTORIAN DIVISION
412 Brunswick Street, Fitzroy, Vic 3065

A master-plan to upgrade the network of VHF and UHF repeaters in Victoria was drawn up after the Ash Wednesday Bushfire Disaster.

More than three years later, with a plenty of behind-the-scenes work, about 90 percent of the plan has been achieved.

The fine network of repeaters should be able to handle amateur traffic requirements to the year 2000.

The WIA Victorian Division sponsors most of the repeaters — and there is three portable repeaters for WICEN which can be used anywhere in the State. The WIA involvement in repeaters reflects the unique nature of Victoria having six WIA zones — these co-ordinate local activity.

Unlike most other States where activity is purely club based — and the clubs install and run repeaters — the WIA Victorian Division Zones look after the repeaters in their area and some raise funds to help with their upkeep.

There is not too many radio amateurs in Victoria who do not have access to the repeater network.

Three groups of two-metre repeaters are to be linked — one reason for linking is to enable a community of radio amateurs in sparsely populated areas to communicate.

Victoria's repeaters will be one of the first in Australia to be linked with duplex UHF links — this means access one of the repeaters in the chain and your signal is re-transmitted on all three repeaters. The links can be isolated if need be — for example, to handle heavy local emergency traffic.

The first trio of linked repeaters will be in north-east Victoria — VK3RNE Wodonga, VK3RPB Bright and VK3RNC Corryong.

The WIA North-East Zone cannot be covered by a single mountain-top repeater and the linked system will give zone members a medium to communicate. The heavily timbered and bushfire prone alpine area now also has the necessary repeater facilities in place for WICEN use.

Similarly, the East Gippsland repeaters VK3RGO Omeo, VK3REG Cann River, and VK3REB Nowa Nowa will be linked and operational in the same manner as those in the North-East Zone.

In the North-Western Zone, VK3RON Ouyen, VK3RMA Mildura and VK3RVL Robinvale are to be a future link-up.

The same comments about linking apply to the three sets of links — they will help bring together radio amateurs in sparsely populated areas, increase repeater use, and be ideal for emergency communications.

For the WIA's Sunday Morning Broadcast, a different form of linking will be used to transmit Institute news and information to members. From the new Lyndhurst broadcast site, the VK3BWI signal will be linked into East Gippsland and to the [illegible].

Investigations are being made into how the North-Western Zone Repeaters can take a feed from VK3BWI.

The broadcast links have been approved by the Department of Communications as one-way and not available for general use by radio amateurs.

The main Melbourne repeater VK3RML is undergoing the final touches of a complete upgrading. A spasmodic and troublesome frequency mix from commercial transmitters at Mount Dandenong should be remedied.

Two new repeaters are still in the planning stages — VK3RMK 147.250 Charlton and VK3RWA 147.100 Ararat — these will fill in holes in the repeater network coverage.

A distinct strategy has been used in planning the location of repeaters to ensure sufficient coverage from the best possible sites. In recognition that UHF works better in and among city buildings when compared with VHF — Melbourne is served by six 70 cm repeaters. Those with UHF in their cars and shacks are finding it an ideal medium for the metropolitan area — an increase in the number of UHF users can be expected in the next decade.

The use of UHF for Melbourne has also released two-metre channels for country areas. In anticipation of a packet radio boom, the Melbourne digipeater, VK3RPK 147.600 has been operating for about two years.

But the most exciting prospect is the Australian East Coast Packet Highway, which will link Brisbane, Sydney, Canberra, Melbourne and Hobart. Victoria's leg of the Highway has packet repeaters VK3RPN Wodonga, VK3RPW Shepparton, and VK3RPL Mount Saint Leonard, north-east of Melbourne. These digipeaters will all be on the national packet frequency of 147.575 MHz.

Over the past three years, the Victorian Division has spent about $20 000 on repeaters and it is the Divisional Council's intention to capitalise the repeaters on the 1986 Balance Sheet. This action is being taken because repeater expenditure has taken a large percentage of member's fees and it is desirable the valuable asset of repeaters be clearly shown.

In 1987, repeater expenditure will be drastically reduced with a $2000 budget. This will go to new repeater works and basically for digipeaters.

In line with WICEN's status in Appendix AJ of the State Disaster Plan representations will be made for State Government funding for WICEN repeater installations.

The Divisional Council's number one priority in 1986 and 1987 has been the VK3BWI Broadcast. After a decade of being located at the Science Museum in Melbourne, the studio had been relocated to Lyndhurst, south-east of the city. Expenditure on the broadcast has been set at a budget of $9 500 for a tower, antennas, cabling, new UHF equipment and a VHF transmitter and console. Modifications and fittings to the building have also been necessary, but the ultimate goal is to give members a weekly broadcast which can (with links already mentioned) be heard throughout the State.

NEW MEMBERS

Members, Council and Executive of the VK3 Division would like to extend a warm welcome to the following members who joined during the month of October 1986.

Julian Beaumont VK3YRL, A Chappelow VK3PMO, Colac Amateur Radio Club VK3CRC, Daryl Cunningham, C T Evans, J Knowles VK3PMT, Adam Maurer VK3YWV, Douglas Paton VK3SF, John Rankine VBE650, Frank Singleton VK3PKX, Abet Suhaian LF0057, A Swarbrick VK3XJW, W Swarbrick VK3XJX, Z Swarbrick VK3XTC, Peter Van Houten VK3XRQ, Herbert Varney and Gregory Anderson VK3NGE.

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Five-Eighth Wave

Jennifer Warrington VK5ANW
59 Albert Street, Clarence Gardens, SA 5039

A very happy New Year to you all. I hope that the Christmas season was a happy one at your QTH and that Santa Claus brought you the right piece of gear (or test equipment, soldering iron, text book, etc).

Around the end of last year the Division received two very nice photographs of historical significance, donated to us by John Allan VK5UL, whose nephew, Bob VK5BJA, is one of our current Council members (this is not John's only claim to fame, as you will read later!).

The photographs are of the Mount Gambier High School Radio Club, which was active from 1928 to 1932 and show —

(Standing) Mr John S Walker BSc, Science Master and Radio Club Leader. Club members (seated LtoR) Arthur Simms, Noel Fredericks, Glen O'Shaughnessy, Rex Sullivan, Michael O'Neil, (hidden person unknown), Ken Crafter, Bob Krumme, Lloyd Orchard, John Heaver and Gilbert Saville.

I wonder if any of these young men gained their licenses and where they are now? (John Heaver is VK3XEH, and had a photograph published of the same class in *Amateur Radio*, May 1986, page 12. —Ed).

HISTORY

The Mount Gambier High School Radio Club was established by John S Walker in 1928. It was disbanded in 1932 when Mr Walker transferred to Adelaide High School.

The Club operated initially from Mrs Olsen's Boarding House, n Helen Street, Mount Gambier, where Mr Walker resided. It was later transferred to the High School.

The station was affiliated with the South Australian Division of the WIA and operated on the 40 metre band. Music and local topics were broadcast on Sunday nights in the 215 metre band. (The class used the call sign OA5GH on 200 metres). Programs were published in the *Border Watch* newspaper.

Technical Details

RECEIVER — originally three tubes, comprising TRF regenerative detector, audio. An additional choke coupled audio stage was added later.

TRANSMITTER — UX201A master oscillator in a split Hartley circuit driving a UX210 power amplifier. Input power 25 watts. Modulation was Heising type, all filaments battery powered.

ANTENNA — Inverted L-Cage with four counterpoise three metres above the ground.

Notes

OA5GH was the first country high school radio club in South Australia.

John S Walker retired as Director-General of Education in South Australia in 1970. He died on a voyage home from Europe in 1971 and was buried at sea. Our thanks to John VK5UL, not only for the photographs which he has donated, but also for these notes which I have copied.

As I said before, having a nephew on Council is not John's greatest claim to fame in the amateur fraternity! Reading Marlene Austin's book *The First 60 Years*, I note that John's first mention was in May 1946, when he was interpreting Ionospheric Prediction Charts (for whom, it does not say). From June 1947 until May 1963, he was teaching AOCP theory classes, some of that time he was assisted by Bruce Busseschutt VK5OR, and some of the time he was paid for it!

In August 1963, he was asked to liaise with the Education Department to organise a youth radio training scheme in South Australia, and in May 1965 he was elected to Council as the Youth Radio Club Scheme representative. By May 1969, he was nominated as Vice-President, and from March 1970 to 1972 he was Divisional President as well as still being the YRCS Liaison Officer. Thank you John Allan, MIREE Chartered Electronics Engineer VK5UL — a hard act to follow.

Speaking of electronic engineers — at the end of last year, Don McDonald VK5ADD and myself, attended an afternoon of 'Demonstrations of Design Projects by Final Year Degree Students' at the School of Electronic Engineering, the Levels Campus of the Institute of Technology. The reason that Don and I were invited was because one of those projects is being sponsored by the WIA. Two years ago, Steve Ireland VK5AOZ, asked Council if the WIA would be prepared to become involved in a scheme whereby firms, individuals or organisations sponsor a project for which they have a need and have it designed by the students (working alone or in pairs) and a prototype built. Steve persuaded us that a two-metre FM RTTY repeater was needed in the Adelaide area, and we agreed (this was before the advent of VK5RSV).

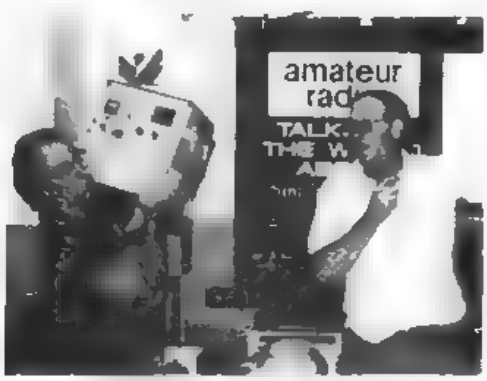
However, Steve and his partner never completed the project, which was continued last year by John Tsimbinos VK5ALG and Paul Burns VK5APG. John and Paul have built the receiver and transmitter, respectively, and we were able to see it working on the test bench. So far it has only cost us a handful of parts from ESC, but we are aware that there will be a nominal cost for paperwork, etc. The device as it stands at the present does not have to become a RTTY repeater, but could be a two-metre repeater for use as a backup repeater or perhaps for WICEN purposes. It has not yet been decided what use we will put it to, nor if we will leave it at The Levels for another 12 months, so that it can become the project for another student/s to finish. However, I would like to thank John and Paul for the effort that they have put into it, and wish them all the best in what looks like two very promising careers in electronics.

The opening speaker for that afternoon was Mr Henry D'Assumpcao, Director, Electronics Research Laboratory, DRCS. I think Don and I were both relieved that he chose to speak about Project Jindalee and the Over-the-Horizon-Radar system, which we could both understand having had a speaker from DRCS explain it to us a couple of years ago, and Ian Hunt VK5QX, write an article on it for AR!

DIARY DATES

January 27 Traditionally the first meeting in the New Year is a *Buy and Sell* night. The only difference between this meeting and our fifth Tuesday night meetings is that ESC, Publications and QSL facilities will be available beforehand, and there will be a short business meeting also. (Commences 7.45 pm).

February 24 Topic not known at time of going to press. Commences at 7.45 pm. (Gates open from 7.00 pm both nights).



Photograph courtesy J P Rodgers VK5KJT

Peter VK5PRM (left) and John VK5JM at the September Buy and Sell.

JTRG AWARD WINNERS

767	VK3VNQ	819	V85RM
768	VK4KGL	822	YB5NOF
769	VK4MAX	823	4Z4OX[9]
770	G4OYU	824	VK5ANW
781	YB8MF	825	N4OAQ
782	YC8OF	826	VK5NZ/W4
783	YB8ZES	831	9M2HB
784	YC5OBB	832	PA3CWJ[10]
785	G4UNH	834	VK4NDG
786	KA8NIT	835	VK5NGT
787	WB5WFW	839	VK4MKT
788	G0DXC	840	VK8ZY
789	G0CCA	841	G0DBE
790	G3CPT	842	VK2POA
791	GW4VBV[1]	843	VK2MAP
792	GW4TFX	844	VK7CV
793	G4WTL	845	VK5NXB/P
794	GM0FQV[2]	847	NN0F
795	G4VPC	848	VK2LEE
796	GM4KLO	849	VK2AZS
797	G4WWP	850	VK2NHH
798	G0ATB[3]	851	FK8AH[11]
799	G3WRD	852	(SWL) ZL1-287
800	GM0ARD	853	JA5LEX
801	(SWL) L40074	854	EA2TSA[12]
802	JR8AYI	855	YC0GVT
803	ZL2MO	856	YC5RO/8
804	ZL3FM	857	NE8E
805	JH9UTY	858	G0AOP
806	OK2BBI[4]	859	AP2SQ[13]
807	ZL1BNW	860	ZL2AKI
808	JE4LPH	861	G2CZO
809	5W1FT[5]	862	G0BNA
810	5W1FM[6]	863	EI6EW[14]
811	9H4E[7]	864	ZL1BXB
812	VK8ATS	865	N4LZH
813	VK6DD	866	VK5PJM
814	ZL1HJ	869	KI4M
815	OZ1LDN[8]	870	IK5FCD[15]
816	YB3CN	871	VK5PEM
817	9M2EE	872	KF5LM
818	V85DU		

1 First GW
2 First GM
3 First G YL
4 First OK
5 First 5W1
6 First 5W1 YL
7 First 9H
8 First OZ
9 First 4Z
10 First PA
11 First FK
12 First EA
13 First AP
14 First EI
15 First I

COMPUTERS

Users of the *Sinclair* range of computers — X81, Spectrum, or QL — may be interested to know of a group of radio amateurs who specialise in the application of amateur radio to this computer.

The Sinclair Amateur Radio Group publishes a newsletter four times a year containing programs and useful hints. It also makes available program tapes on a wide range of radio topics, including [redacted].

Membership for non-UK amateurs, including airmail delivery of the newsletter, is £stg8 per annum (in Sterling only) payable to P Newman G4INP, SARUG, 3 Red House Lane, Leiston, Suffolk, IP16 4JZ, England.

—Contributed by Bob Arnold VK3ZBB

THEFTS UP

O Home computers and microwave ovens have replaced video equipment as a popular target for thieves and are one of the most marketable items on the crime scene.

The Insurance Council of Australia says there is a glut of videos and burglars raiding homes and schools are looking particularly for computers.

THOUGHT FOR THE MONTH

O What we see depends mainly on what we look for!

Over to You!

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

TECHNICAL MAILBOX

I am sorry to be so long in replying to your request for more information on my problem with my power supply. I have had so many amateurs anxious to help me after reading the October AR, that I need bother you no further.

It was as you suggested — inadequate earthing and the fact I used a picofarad capacitor instead of a microfarad!

Also, regarding the ATU, this was explained to me and I would like to thank you and your column for your help.

I feel sure the Technical Mailbox will fill a need for all amateurs.

Yours sincerely,

Albert Davey VK6ARD,
12 Lillian Street,
Cottesloe, WA.

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IN AGREEMENT

I am in complete agreement with the comments by Sid Molen VK2SG, in his letter *Ego Boosting* in AR for October, concerning emergency communications and those who deliberately ignore past history and the achievements of experienced amateur operators.

I read the "hogwash" letter in July AR headed: *Emergency! Are we ready?* by Sam Voron VK2BVS, and decided that I would be wasting my time replying to such nonsense.

In the past I have adequately pointed out in these columns the immature shortcomings and incorrect approach to emergency communications exhibited by the Australian Traffic Net and the July letter fully confirms my previous statements.

Not only Sam, but also other "Ego Trippers" in the Institute have deliberately published incorrect statements concerning previous emergency operations which have had to be corrected by those who actually took part in them.

As Sid points out there are plenty of "Old Timers" with a wealth of knowledge and experience in radio communications, particularly emergency communications, who are willing to help, advise and even train newcomers in this important facet of our hobby.

A better understanding of the basics of radio communications will make better amateur radio operators which, in turn, will make for more competence in handling emergency situations.

One way to achieve this is for more amateurs to become involved in WICEN.

73,

Ted Gabriel VK4YG,
PO Box 245,
Ravenshoe, Qld. 4872.

ar

HAPPY ROSH HASHANA

On the Labour long-weekend, Sam VK2BVS, decided to set up an amateur radio demonstration station in the heart of Kings Cross, New South Wales. The purpose of the station was originally to demonstrate two metre repeater operation and take messages for Third Party Traffic to USA, Canada and Israel.

The same week being Navy Week, also helped due to the foreign warships in port.

I heard Sam operating and asked if he needed some help and down I came. After being briefed on Third Party Traffic, we were in business together.

Many messages were taken and promptly started their journey the following afternoon. With Sam's station, many messages were sent direct.

You are still wondering what the title means? That same weekend was the Israeli New Year and a group of Israeli visitors took the opportunity to send greetings to their loved ones and families. One of them also sent a message to the Israeli Prime Minister.

This is one of the many ways the public can see amateur radio in action, if only in a small way. We were visited by a lady from New Zealand and a Tasmanian visiting the mainland. Many thanks to everyone who came up on the repeater to assist in making contacts.

The Israeli Group witness amateur radio.

Two visitors experience two-metre repeater operation demonstrated by Sam VK2BVS and Greville VK2JGR.

This exercise was done purely as a hobby and messages were handled gratis. We were offered remuneration at several stages but politely refused and explained the regulations.

Greville Knight VK2JGR,
HMAS *Orion*,
International Mail Exchange,
Sydney, NSW.

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MARITIME MOBILE

Firstly, thanks for an excellent and most interesting magazine, I look forward to every issue.

Two great interests of mine are, amateur radio (25 years) and 'being on the water.' I have operated Maritime Mobile for many years, mostly out in Bass Strait on a survey ship, running a variety of antennas, mostly long wires by necessity.

Now, being fed up with the sharks ashore, I've taken to the water again, this time on my own little yacht, a 25 feet (8 metre) sloop.

Naturally, one of the first pieces of equipment to go onboard was the amateur rig, so I would be interested to hear from other 'boaties' as to effective antennas.

The backstay is loaded up, but is not too good on some bands, especially 80 metres. I can't quite manage a three-element monobander atop the mast. Believe it or not, I saw one on a yacht in Canada!

Any information on maritime mobile nets and scheds would also be appreciated.

Something else of interest — do any of the old timers remember back in the 40s, there was a thermocouple generator available somewhere which ran off a kerosene lamp? Apparently it produced enough power to operate a small valve-type mantle radio.

Also, I believe, nowadays some of the commercial repeater stations in remote areas, use a thermocouple generator powered by propane gas.

I would appreciate any information on any of the above — power is short out on the water!

Cheers and 73,

Pete Robinson VK2DFR,
PO Box 290,
Milsons Point, NSW. 2061.

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FRIGHTENING

The editorial (reprinted below) appeared in *The Short Wave Magazine* September 1986.

It is frightening. It could just as well happen here with government policy changes, and political party changes, with pressure being applied by industry. The situation in the UK needs to be closely watched, along with ideas and attitudes of our own DOC.

Being employed in the electronics industry, the EMC situation is interesting. Many of my colleagues, with little or no radio knowledge, are ignorant — or worse, do not care about EMC. They think it is funny, and say "Bad luck, mate!" Some of the computer buffs think their computers are sacred and become abusive if RF gets into their beloved equipment.

It is interesting to note the number of amateurs who have become involved in computers and are heard less and less active on the air!

Yours faithfully,

Steve Mahony VK5AIM,
19 Kentish Road,
Elizabeth Downs, SA. 5113.

RIS PROBLEM

We have recently received from several quarters comments that indicate a changed attitude on the part of the Radio Interference Service staff, to lend credence to this we have just been sent a copy of a document entitled "Strategy for Dealing with the Problem when Amateur Radio Users Cause Interference to Neighbours" — without any covering letter. From the structure of this 'leaked' document we deduce it was formulated by the RIS management.

The result of full implementation of the ideas contained in this paper would be catastrophic, even to the point of spelling a virtual end to amateur radio activity as we know it today with VHF particularly badly affected. In the recent past RIS staff have intimated that in cases of intractable TVI they would request the DTI to vary the licence conditions to enable them to enforce reduced power to as low as three watts or even enforce QRT. The document also makes it crystal clear that this change of attitude has been created by the anti-social attitude of a small number of amateur licensees. Couple this with the general notion that television is something akin to God only higher, and therefore cannot be questioned or taken to task for the interference *it* produces, and you can see that we have a real problem on our hands.

What now arises? First, let it be quite clear that the RSGB have spent, and are spending, hundreds of man-hours on fact-finding and negotiation with regard to this document. So please *don't* descend on RSGB Headquarters with queries demanding an answer, or you'll bring the entire organisation to a halt. Let them get on with their work for all of us, and give them every support you can. We *must* close ranks or we are lost.

Something which makes this threat so very dangerous is, of course, the idea of passing interference-solving activity to the radio/TV trade — an idea which is, and always was, ludicrous for the simple reason that interference is something of a development engineer's problem, and this is an area in which, by definition, even competent servicing personnel lack know-how.

There was a proposed British Standard covering the question of immunity to interference in the pipeline, but this has gone by the board in favour of a CENELEC (ie EEC) standard which is in many ways better, though still not nearly good enough. The CENELEC standard lays down immunity of equipment to signals of approximately 1.8 volts/metre, and the intention seems to be to require amateurs to reduce power until that level is met and then continue operation using only that low power for ever after.

Clearly, that means that an amateur who lives in an urban area is at serious risk through TVI, because of the inadequacies of cheap-and-cheerful commercial entertainment products — although to be fair, the document does acknowledge that much domestic radio and electronic home entertainment and communications equipment is cheaply engineered with respect to immunity from unwanted radio signals. It also recognises that the amount of such equipment, which unless adequately shielded is sensitive to RFI, is growing rapidly. If we accept that the life of, say, a TV set is around 10 years, we can see the average UK radio amateur being reduced to QRP at best for the next decade at least.

All we can do at the moment is close ranks behind the RSGB and hope they can get a positive response out of the authorities. Of course if you know of an amateur who is behaving in an anti-social way over TVI and his neighbours, then bring the *strongest possible* pressure to bear on him to either close down or clear the TVI problem; throwing him out of the club is mild compared with all of us having to become QRP — or even QRT.

Looked at from a wider aspect for a moment, the powers-that-be would do well to understand that a 'national QRT' would be disastrous: much of the electronics industry's development work is done by the younger generation of engineers, and we know that many of these gained an initial interest through their early contact with amateur radio, even though they may have later given up their licence. Thus we stand to see sections of the electronics industry put at risk for want of new blood coming up through the amateur fraternity, who almost alone provide the know-how outside the ranks of the digital circuitry merchants.

Signed: G3KFE

—Editorial from *The Short Wave Magazine* September 1986

IDENTIFYING QRM IN STEREO

Some types of "splatter," "mixed modulation," and "tone burst" interference are quite difficult to identify unless the source can be correlated with the result.

This can often be achieved using two receivers, one of which must be a general coverage type, while the other may be single band or fixed tuned to the interference. Take the single channel headphone output of each receiver to the L and R channels of a pair of stereo headphones, then tune the general coverage receiver down (usually) through the band.

When the source of interference is tuned, the modulation products "meet between the ears" to correlate the two, even though each is unintelligible in the normal sense!

For example, the "mixed modulation" from a third order product ($2 \times F1 \pm F2$) of two broadcast stations synchronises in musical beat or speech syllables although the interference is still hopelessly mixed up. The same applies for a foreign language, SSB "splatter" and even RTTY harmonics!

Bill McLeod VK3MI,
42 Capon Street,
Chadstone, Vic. 3148.

CORRECTION

Unfortunately, in the article *Matching Impedance Formula* which appeared on page 3 of November AR, there was an extra **0 added to the last equation, six lines from the bottom of the page. The equation should read:**

$R_s = R_L$ (not $R_s = R_L = 0$).

Apologies to all readers and, most importantly, the author who may have had his maths doubted!

Silent Keys

It is with deep regret we record the passing of —

MR JIM CUNNINGHAM VK3PHJ
MR L O OAKLEY [redacted]

Obituaries

CLAUDE VAUTIN VK4KDQ

It is with regret we record the passing of Claude Vautin VK4KDQ, aged 76. Claude suffered a stroke and died peacefully just over three weeks later, on October 16, 1986.

At the age of 70, Claude decided to study for his amateur licence and, having been employed at the local Electricity Board for all his working life, the theory was a breeze, but like many others, he had trouble with the 10 WPM CW and regretfully had not obtained his full call.

He spent many happy hours talking to his mates and was always very willing to help students with their theory.

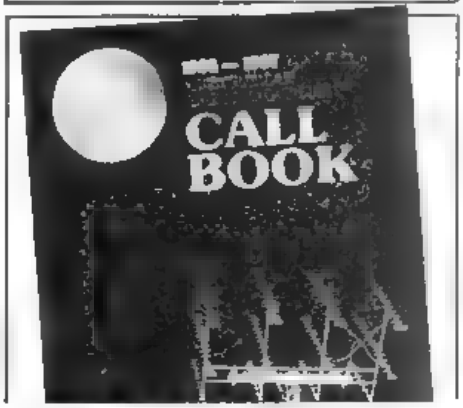
Claude was a good club member, having held the position of Station Manager and participating in club meetings — his ready wit, infectious smile and helping hand will be sorely missed.

The people paying their last respects overflowed the large church and this is indicative of the high esteem in which Claude was held in the Cairns community.

The Cairns Amateur Radio Club members extend their sincere sympathy to his devoted wife, Ethel, his four daughters and [redacted].

Claude was truly a gentle man.

[redacted] VK4PAH



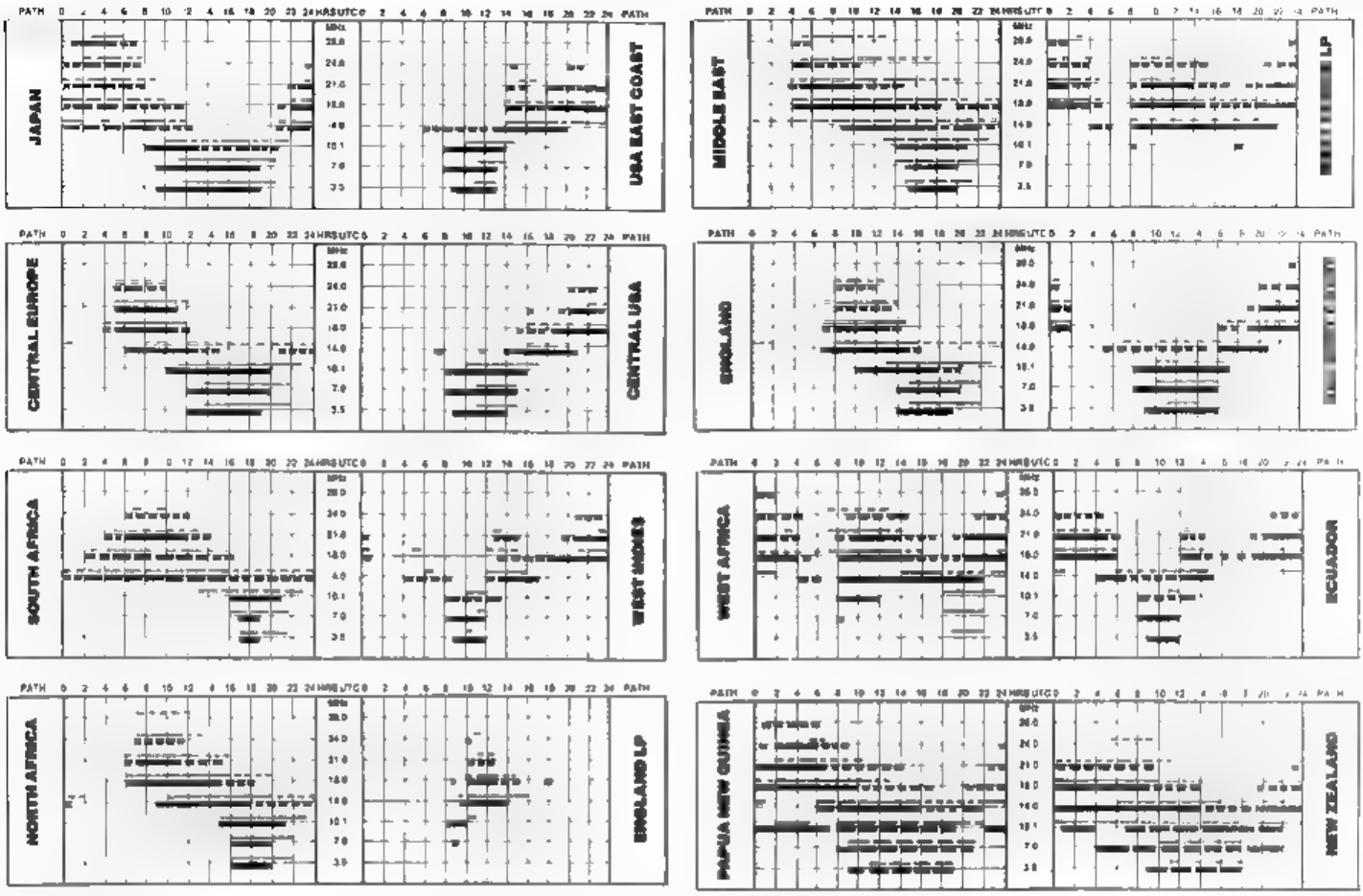
CHANGE OF CALL SIGN OR ADDRESS

Within days of the new Call Book being released, the Federal Office was receiving letters from amateurs that their details in the Call Book were incorrect. The WIA regularly receives updated information from the Department of Communications listing new call sign allocations and changes of call sign and address. The system works well — most of the time. Occasionally, there are delays or omissions.

All amateurs, whether they be members of the WIA or not, are requested to notify the Institute of changes of call sign or address to ensure that their entry in the Call Book is correct. When notifying the WIA of a change, please give both ***old details as well as new.*** If you are a member, please include a recent AR label if possible, to enable us to positively identify the record to be changed.

Ionospheric Predictions

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic 3060



LEGEND
From Western Australia (Perth)
From Eastern Australia (Canberra)

Mixed mode dependent on angle of radiation (long broken lines).

Better than 50% of the month, but not every day (continuous lines)

All paths unless otherwise indicated; (ie LP = Long Path) are Short Path.

Less than 50% of the month (short broken lines).

Predictions are presented courtesy of the Department of Science, IPS Radio and Space Services, Sydney

Solar Geophysical Summary

SEPTEMBER

Solar activity was low in September with no energetic solar flares being observed. The sun was spotless except for 1-4, 6-9 and 29-30. During those periods there were small regions visible. The absence of spots is reflected in the very narrow range of the 10 cm solar flux.

The readings for the month were:
1=69, 2-4=68, 5=69, 6=68, 7=69, 8-13=68, 14=69 15=71, 16=70, 17=69, 18-24=68, 25=69, 26=68, 27=69, 28=70, 29,30=71
Average was 68.7

Sunspot number for the month was 3.9. The yearly average number was 13.1 centred on March 1986.

GEOMAGNETIC

It was a disturbed month with eight days on which the A-index equalled or exceeded 20. Those included the 12th and 23rd, on which the field was at major storm levels. There were also two extended periods of disturbed conditions — 11-15th and 23-27th.

September 2 The field became disturbed after 0300 UTC and remained that way until 1500 UTC. A=20.

September 11-14 The field became disturbed on 11 and a sudden jump in field around 1830 UTC. It was at major storm level from 2100 UTC until 1200 UTC on 12th and remained at active to storm levels until 0300 UTC on 14th. A=13, 49, 20, 13.

September 15 The field was disturbed in the early UTC day. A=15.

September 18-21 The field was generally disturbed with intervals of minor storm conditions. A=19, 17, 19, 12.

September 23-28 The field became disturbed after 0600 UTC on 23rd. It was at major storm levels for the remainder of the UTC day and at active to minor storm levels on 24-27 and gradually subsiding on the 28th. A=35, 23, 22, 21, 22, 15.

—From data supplied by the *Department of Science IPS Radio and Space Services*, September 1986
ar

RADIO COMMUNICATIONS

RADIOCOMMUNICATIONS CITATION

A radiocommunications citation will be awarded to amateur radio operators or anyone assisting those operators during the national Australian telephone breakdown of June 10-17, 1981, and/or the Mexico City Earthquake, September 21-25, 1985 and/or the San Salvador City Earthquake, October 11- 19, 1986 during which time, radio amateurs and their friends came to the service of distressed members of the Austral an community

Persons and Organisations qualifying for this Award — will have either originated, relayed or delivered messages on the air, over the telephone or by any other means, or provided updates to organisations, such as government departments or to national associations, or assisted as a net control or relay station or been available in some way eg a non-licenced person helping an involved operator, or a CB operator assisting in delivery or message collecting in the local area or other members of the public whose special help is acknowledged.

Overseas amateurs or anyone who assisted them (as described earlier), in handling Australian third-party messages also qualify for this award. All Mexican radio amateurs involved in 1985 and all El Salvador amateurs involved in 1986 qualify. United States, Canadian and others who assisted Australian messages to flow in anyway also are eligible. This includes anyone who helped an overseas amateur; eg non-licenced person

By now, citations will have been forwarded to persons and organisation known to have been involved. It is inevitable that, in efforts of such magnitude, participants may have been overlooked, be unknown, or changed address or call sign. Therefore, the citation is also being offered as a general award. Send details of your involvement to: Sam Voron VK2BVS, 2 Griffith Avenue, Roseville, NSW. 2069.

THIRD-PARTY TRAFFIC

The State Visit to Australia by His Excellency, the President of Israel, Mr Chaim Hertzog, is one of the greatest manifestations of the good and friendly relations between our two countries. We are glad to note that the visit follows the entering into force a very few months ago of a Third-Party Traffic agreement between the governments of Australia and Israel. Though very little publicised outside AR circles, this agreement, we are sure, constitutes a welcome and important contribution to the advancement of co-operation and good relations between Australia and Israel and of human connections among the people of the world in general.

Signed Y Lavie
Minister Councillor
Embassy of Israel, Canberra, ACT.

—WIA Third-Party Traffic, from VK2BVS to VK3CKK

TV WATCHES

O The term "watching the clock" could take on a whole new meaning when television watches become available.

A recent marketing seminar in Japan revealed the television watches about twice the size of a normal wrist watch developed for the American market could be in Australia within three years.

DEADLINE

DEADLINE

All copy for inclusion in the March 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9am, January 19, 1987.

Hamads

PLEASE NOTE: *If you are advertising items FOR SALE and WANTED please write each on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. Please do not use scraps of paper*

* Please remember your STD code with telephone [redacted]
* Eight lines free to all WIA members. $9.00 per 10 words minimum for non- members
* Copy in typescript, or block letters — double-spaced to **Box 300, Caulfield South, Vic. 3162**
* Repeats may be charged at full rates
* QTHR means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows:

$22.50 for four lines, plus $2.00 per line (or part thereof)

Maximum charge — $22.50 pre-payable

Copy is required by the Deadline as indicated below the indexes on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For data and price list send 105x 220mm SASE to: **RJ & US IMPORTS,** Box 157, Moriddle, NSW. 2223. (No inquiries at office . 11 Macken Street, Oakley). Agencies at Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albury, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza. ACT

WANTED — NSW

DETAILS FROM CLUBS & GROUPS: about their formation & activities so they can be included in the Club Portrait series in AR magazine. Some brief details & contact name, plus phone number to Jim Linton VK3PC, QTHR.

FOR SPOT CASH: Kenwood 930S in good condition. Complete with ATU903 & CW filters. Al Davies-Rice VK2AXR. Ph: (02) 477 6275.

SERVICE MANUAL: for Kyokuto 2025A 2m rig. Purchase or loan for copying. Cash recompense. VK2IS, QTHR.

TRANSCEIVER: for 70 cm, amateur or commercial crystal controlled. Barry VK2AAB, QTHR. Ph: (02) 487 1428.

TWO METRE FM RECEIVER BOARD: out of IC22A or similar. John VK2DFC, QTHR. Ph: (069) 62 5547 AH.

YAESU RSL-3.5 MOBILE ANTENNA: for use with RSM-2 base and RSE-2A 2m stub. Brian VK2QP, QTHR. Ph: (02) 451 0618.

WANTED — VIC

CIRCUIT DIAGRAM: copy of circuit diagram &/or manual for AR8 wartime receiver. Will pay any costs involved. Ralph Birrell VK3EIP, QTHR. Ph: (054) 39 5428.

KENWOOD TS-130S or ICOM 730: Must be in good condition. Top price paid for good unit. VK3XV, QTHR. Ph: (03) 527 4029 after 5 pm. Reverse charges okay.

WANTED — QLD

DETAILS FROM CLUBS & GROUPS: about their formation & activities so they can be included in the Club Portrait series in AR magazine. Some brief details & contact name, plus phone number to Jim Linton VK3PC, QTHR.

INFORMATION ON SIEMENS FAX MACHINE: Borrow or buy. VK4PJ, QTHR. Ph: (07) 399 2881

QST MAGAZINES: in good condition. VK4JZ, QTHR. Ph: (07) 398 2002

TS-830S OR SIMILAR TRANSCEIVER: with WARC bands. Full details to VK4XA, QTHR. Ph: (07) 263 6812.

WANTED — WA

TRI-BAND ANTENNA: TH3 jnr or HQ1 or similar small beam. Arthur VK6SY QTHR.

FOR SALE — NSW

KENWOOD 820: very good condition, manual and workshop manual. $450. Yaesu FT-101EE with all mods to bring to FT-101E manual. Kenwood 7400A 2m, $200. Deceased estate of OT VK2BRI. Hal VK2HW. Ph: (02) 810 1702

YAESU AUTO ANTENNA TUNER: FC757 AT for use with FC757GX or FT980/S or FT77/S. Very clean in original carton with manual & leads. $420. Bob VK2JZ, QTHR. Ph: (02) 44 7701

FOR SALE — VIC

ICOM IC-22S: 2 metre FM tcvr, good performer with mic, mobile bracket, handbook. Ideal as a backup rig or for newcomer to investigate 2m without costing an arm or leg. $165. B Bathols VK3UV, QTHR. Ph: (03) 580 6424.

MICRONTA DIGITAL MULTIMETER: ohms 0.1 ohms to 20 meg. AC/DC mA 1uA to 200 mA, AC/DC volts 1 mV to 500/1000 volts. $50. Two Pearce Simpson Shuttlecock MX215 headset tcvrs on 55.035 MHz. New, $120 or best offer for pair. No licence required. Various miniature & octal valves, $1 to $5 plus post. About 200 all told. WWII ex-service army radio equipment suitable for museum. What offers? R Champness VK3UG, QTHR.

MOBILE 2 METRE XTAL CONTROLLED: Ch — RMA, RMM, RGL, RBA. SHEP Simplex — 40, 50, provision for 12 chs. $130. Good cond. Ashi gutter grip base & 5/8 Ashi whip. $30. VK3FT, QTHR. Ph: (03) 862 4853 after 5 pm & weekends.

FOR SALE — QLD

ICOM 740: workshop manual. $20. VK4PJ, QTHR. Ph: (07) 399 2681

Advertiser's Index

SENSATIONAL OFFER!

2 METRE 5 WATT HAND HELD

Only $275

TH-205A ILLUSTRATED

FEATURES	TH-205A	TH-215A
POWER OUT	5 WATT	5 WATT
FREQUENCY	144 MHz-148 MHz	144 MHz-148MHz
MEMORY CHANNELS	3	10
KEYBOARD ENTRY	NO	YES
UP/DOWN SCAN	YES	YES
FREQUENCY LOCK	YES	YES
EXT. SPEAKER/MIC.	YES (OPTION)	YES (OPTION)
12 VOLT CIGAR PLUG	YES (OPTION)	YES (OPTION)
WEIGHT	350 gms	350 gms
SIZE	70W X 180H X 40D	70W X 180H X 40D
SUPPLIED ACCESSORIES	AA BATTERY PACK AERIAL	AA BATTERY PACK AERIAL
	$275	$350
OPTIONS (See your dealer for prices)	NICAD PACK CHARGER	NICAD PACK CHARGER

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.

4E WOODCOCK PLACE, LANE COVE, SYDNEY, N.S.W. 2066. Ph. (02) 428 1455.

YOUR DEALER BELOW WILL GUARANTEE SATISFACTION

Further, beware of dealers not listed in this advertisement who are selling Kenwood communications equipment. All Kenwood products offered by them are not supplied by Kenwood Electronics Australia Pty. Ltd. and have no guarantee applicable

N.S.W.
KENWOOD ELECTRONICS AUSTRALIA PTY. LTD. 4E WOODCOCK PLACE LANE COVE (02) 428 1455
EMTRONICS 94 WENTWORTH AVENUE SYDNEY (02)211 0988
REG STOCKMAN COMMUNICATIONS CNR BANKCKBURN ROAD & SHIRLEY STREET INVERELL (067) 22 1303
WORMALD COMMUNICATIONS 51 DENNISON STREET HAMILTON NEWCASTLE (049) 69 1999
MACE HE PTY. LTD 99 KENNY STREET WOLLONGONG (042) 29 1455
E & K COMMUNICATIONS 4 DUTTON STREET DICKSON A.C.T. (062) 49 6437
DX ENGINEERING 158 GRANITE STREET PORT MACQUARIE (065) 84 0922
FRANK BOUNDY LISMORE (066) 86 2145

INTERSTATE

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PARAMETERS PTY. LTD 1064 CENTRE ROAD SOUTH OAKLEY (03) 575 0222
EMTRONICS SHOP 5 288-294 QUEEN STREET MELBOURNE (03) 67 8131
BRIAN STARES 11 MALMSBURY STREET BALLARAT (053) 39 2808
SUMNER ELECTRONICS 78 KING STREET BENDIGO (054) 43 1977
HOBBY ELECTRONICS 477 NELSON ROAD MT NELSON (002) 23 6751

TAS
WATSONS WIRELESS 72 BRISBANE STREET HOBART (002) 34 4303
MARINE & COMMUNICATION 19 CHARLES STREET LAUNCESTON (003) 31 2711
V.K. ELECTRONICS 214 MOUNT STREET BURNIE (004) 3 7733

QLD
MITCHELL RADIO CO 59 ALBION ROAD ALBION (07) 57 6830

S.A. & N.T
INTERNATIONAL COMMUNICATIONS SYSTEMS PTY. LTD 8 MILE STREET PORT ADELAIDE (08) 47 3680

W.A.
WILLIS ELECTRONICS 165 ALBANY HIGHWAY VICTORIA PARK (09) 470 1118
BAY RADIO 22 GRACE STREET FERNDALE (09) 451 356
FORD ELECTRONICS 209 HANCOCK STREET DOUBLE VIEW (09) 446 4765

NEW RELEASE

The ham burger with the lot – IC-751A

LOUD & CLEAR

- **All HF Band Transceiver/General Coverage Receiver**
- **100% Duty Cycle Transmitter**
- **New Design**
- **105dB Dynamic Range**
- **12 Volt Operation**
- **All Modes Built-In USB, LSB, AM, FM, CW, RTTY**

The new IC-751A top-of-the-line HF base station transceiver is designed for the ham operator who demands high performance.
Whether entering contests or QSY'ing for pleasure, the 100 watt IC-751A incorporates the best features of the IC-751, and brings you to the forefront of technology with the following most-requested additions.
More CW Control. For the CW enthusiast, the new IC-751A includes an electronic keyer unit, QSK rated at up to 40WPM, standard FL-32A 9MHz/500Hz CW filter and CW sidetone to monitor your code in RX or TX modes . . great for practice!
All Amateur Band Coverage. Includes general coverage reception from 100kHz to 30MHz, and may be easily modified for MARS operation.

Improved Smooth Tuning. The IC-751A features a newly designed tuning control for velvet smooth tuning
Added LED Annunciator. For easy identification if you're using the tuning speed, dial, or band switching functions.
32 Memories. Mode and frequency data may be stored in any of 32 memories . . all the memory capability that you'll ever need
More Stable. Even in the receive mode, the IC-751A has a sophisticated thermal sensor to monitor the internal temperature. The sensor automatically activates the cooling fan which gives maximum stability . . . critical for optimum performance during contests.
Newly Designed Features. The IC-751A boasts a number of newly designed features for better performance . . . a new 9MHz notch filter that drastically reduces QRM, a new AGC system, a new compressor for better audio clarity, and a new AF gain control system that improves control of the CW sidetone volume.
Options Available. Options for the IC-751A include the IC-PS30 external AC system power supply, IC-PS35 internal AC power supply, IC-AT500 antenna tuner, IC-EX309 microprocessor interface connector, SM-8 or SM-10 desk mics, IC-2KL linear amplifier, RC-10 remote controller, SP-7 or SP-3 speakers, IC-EX310 voice synthesizer and GC-5 world clock.
Optional Filters. FL-52A CW 455kHz at 500Hz, FL-53A CW-N 455kHz at 250Hz, FL-63A CW-N 9.0106MHz at 250Hz, FL-33 AM 9.010MHz at 6000Hz, and CR-64 high stability 30.72MHz crystal filter.

Please send me details on:

☐ IC-751A ☐ ICOM's full range of communications equipment.
Senders details:

Name _____

Address _____

Postcode _____

Phone: (Business) (Home)

All stated specifications are approximate and subject to change without notice or obligation.
ICOM customers should be aware of equipment not purchased at authorized ICOM Australia Agents. This equipment is not covered by our parts and labour warranty.
POST TO: ICOM, 7 DUKE STREET, WINDSOR, VICTORIA 3181 OR PHONE (03) 512 2841 OR 529 7582

3555

ICOM

The Frequency of Ideas.

WIA
STOP PRESS

A M A T E U R E X A M I N A T I O N S

W.I.A. POSITION?

The Department of Communications have notified the Institute that they would like to devolve Amateur Certificate of Proficiency examinations. They have, over recent years, handed over responsibility for conducting the major portion of Commercial Operator Certificate examinations to outside bodies. At present only examinations for Amateur and Restricted Radio Telephone Operator Certificates of proficiency (RROCP) are conducted by the Department.

In view of the reduced number of examinations and increasing pressure on resources, the manpower in the Department's examination area has undergone a considerable reduction. These aspects coupled with the Prime Minister's call for every Australian to examine how they can perform their work more efficiently, more effectively and more economically has prompted the Department to review its examination role.

Under the Radiocommunications Act 1983 provisions have been introduced which allow examinations conducted by external bodies to be accepted for the purpose of certificate issue. The Department has recently completed a draft RROCP accreditation package and one has also been developed for the Amateur certificate examinations.

The Department have circulated draft accreditation packages to Colleges, Institutions, other educational bodies and Clubs for comment. The Department stresses that no change in existing examination standards is contained in the Amateur accreditation package and that they will retain the overall responsibility for maintenance of standards.

In accordance with the consultation procedure outlined, the Department have invited the Institute to comment on the draft Amateur Certificate accreditation package. An indication of whether the Institute would be interested in accreditation is required by 1st March, 1987.

Extracts from Draft Accreditation Package.

AMATEUR OPERATORS CERTIFICATES OF PROFICIENCY ACCREDITATION REQUIREMENTS

1.0 INTRODUCTION

The Department, under section 31 of the Radiocommunications Act 1983, may for the purposes of issuing an operators certificate of proficiency approve examinations conducted by external bodies. Only examinations which are of equivalent or higher standard than that specified in the Radiocommunications (Certificate of Proficiency) Regulations will normally be accredited.

Where an examination is recognised, certificate applicants who present proof of a pass at that examination to the Department will be issued with an appropriate grade certificate.

Set out in this package are the requirements that must be met for accreditation in respect of the three classes of Amateur Operator Certificates of Proficiency, namely:

Amateur Operators Certificate of Proficiency (AOCP)
Required by radio operators of an Amateur Station (unrestricted)

Amateurs Operators Limited Certificate of Proficiency (AOLCP)
Required by radio operators of an Amateur Station (limited)

Novice Amateur Operators Certificate of Proficiency (NAOCP)
Required by radio operators of an Amateur Station (novice)

2.0 ORGANISATIONS THAT WILL BE ACCREDITED

Applications for examination accreditation in respect to all classes of Amateur certificaes will be considered from Colleges, Institutions, other like educational bodies and recognised amateur clubs.

3.0 METHOD OF ACCREDITATION

<u>Colleges, Institutions and Educational Bodies</u>

The Department will assess applications, submitted for accreditation against the:

- *content specified in the relevant syllabus set out in Appendix (A)*
- *examination question/test format outlined in Appendix (B)*
- *question standard in Appendix (C), and*
- *compliance with the requirements in 4.0 A - H.*

Amateur Clubs

In the case of amateur clubs, the Department will assess applications for accreditation taking in to account:

- *the reasons put forward by the club in support of the application*
- *comment provided by the Wireless Institute of Australia on the clubs suitability to conduct examinations;*
- *compliance with the requirements outlined in 4.0 A-D and F-I.*

Clubs which meet the accreditation requirements will be provided with the Departmental "question bank" from which to formulate examination papers. The examination format outlined in Appendix (B) must, however, be utilised.

4.0 REQUIREMENTS FOR ACCREDITATION

All applicants for accreditation must provide the Department with the following:

(A) Full name of the college, institution or club;

(B) The class of Amateur certifiate for which accreditation is required;

(C) The title of the exam (or course);

(D) An indication of the examination frequency;

(E) A sample of the examination proposed including:
- *theory questions*
- *morse code receiving test*

(F) A list of equipment available for the morse code receiving and sending tests;

(G) Details of the examiners and their qualifications;

(H) A sample of the form of advice that would be provided to successful candidates, including nomination of the person who would sign the form;

(I) In the case of Clubs, applicants should also provide:
- *reasons in support of the application.*
- *comment from the Wireless Institute of Australia.*

Should accreditation for more than one class of Amateur examination be proposed, applicants should provide the information in (B) - (H) for each examination.

5.0 EXAMINATION ASSESSMENT

Accredited organisations will be required on an annual basis, or where requested, to provide a sample examination to the Department.
In order to ensure standards are maintained, the Department reserves the right to have a representative present at any accredited examination.

6.0 EXAMINATION EXEMPTIONS

Accredited organisations:

- may grant exemption from re-examination in any subject which a candidate has successfully passed. Where such an exemption is granted, a formal letter detailing the exemption shall be given to the candidate. This letter shall be under the signature of the nominated person responsible for issuing examination results.

- must recognise exemptions previously granted by the Department.

- should accept, for the purposed of exemptions, the qualifications specified in column 1 of Appendix (D) in respect to the subject listed in column 2 under the relevant examination heading.

Executive are concerned at the broad devolution of the amateur operator examination and the varying standards that could result from such an action. They consider that it would be detrimental to the future developement of amateur radio in Australia.

It is considered possible, if the feeling of amateurs is strong enough, that the department may reconsider its position and continue to produce amateur operator examination papers with the possibility of the WIA and amateur radio clubs being involved with the conduct of examinations.

Executive are seeking members views on this matter and request that you write to your Division's Federal Councillor who will collate your responses and forward them to the Executive.

FEDERAL COUNCILLORS ARE:

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